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FLOOD INSURANCE STUDY

TARRANT COUNTY, TEXAS
UNINCORPORATED AREAS

5/1/88

AUGUST 4, 1987

Federal Emergency Management Agency

COMMUNITY NUMBER - 480582

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NOTICE TO
FLOOD INSURANCE STUDY USERS

Communities participating in the National Flood Insurance Program (NFIP) have established repositories of flood hazard data for floodplain management and flood insurance purposes. This Flood Insurance Study (FIS) may not contain all data available within the repository. It is advisable to contact the community repository for any additional data.

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Flood Boundary and Floodway Map

PUBLISHED SEPARATELY:

Flood Insurance Rate Map Index
Flood Insurance Rate Map

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FLOOD INSURANCE STUDY
TARRANT COUNTY, TEXAS

1.0 INTRODUCTION

1.1 Purpose of Study

This Flood Insurance Study investigates the existence and severity of flood hazards in the unincorporated areas of Tarrant County, Texas, and aids in the administration of the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973. This study has developed flood risk data for various areas of the community that will be used to establish actuarial flood insurance rates and assist the community in their efforts to promote sound flood plain management. Minimum flood plain management requirements for participation in the National Flood Insurance Program are set forth in the Code of Federal Regulations at 44 CFR, 60.3.

In some states or communities, flood plain management criteria or regulations may exist that are more restrictive or comprehensive than the minimum Federal requirements. In such cases, the more restrictive criteria take precedence and the state (or other jurisdictional agency) will be able to explain them.

1.2 Authority and Acknowledgments

The sources of authority for this Flood Insurance Study are the National Flood Insurance Act of 1968 and the Flood Disaster Protection Act of 1973.

The hydrologic and hydraulic analyses for the following streams studied in detail for the Tarrant County Flood Insurance Study were prepared by the U. S. Army Corps of Engineers (COE), Fort Worth District, for the Federal Emergency Management Agency (FEMA) under Interagency Agreement No. EMW-E-0941, Project Order No. 12: Bear Creek 1, Briar Creek, Chambers Creek, Deer Creek, Elm Branch, Marys Creek, South Marys Creek, Stream VC-5, Stream VC-6, Stream VC-7, Village Creek, Walnut Creek 3, West Fork Trinity River, and Willow Branch. The work for this study was completed in March 1984. Information for all other streams studied in detail were taken from the Flood Insurance Studies for the Cities of Azle, Benbrook, Burleson, Crowley, Fort Worth, Haslet, Mansfield, and Southlake.

1.3 Coordination

On February 19, 1982, an initial Consultation and Coordination Officer's (CCO) meeting was held with representatives of FEMA, the Tarrant County

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Water Control and Improvement District No. 1 (TCWCID #1), and the COE (the study contractor). The COE was instructed to use TCWCID #1 data on Eagle Mountain Lake for the 10-, 50-, 100-, and 500-year frequency flood elevations.

Numerous meetings were held between FEMA, the City of Fort Worth, the TCWCID #1, and the COE to discuss the West Fork Trinity River.

The Soil Conservation Service (SCS), the U. S. Geological Survey (USGS), the Texas Department of Water Resources (TDWR), the Texas Department of Highways and Public Transportation, and the North Central Texas Council of Governments were contacted for information about this study.

A final CCO meeting was held with representatives of FEMA, Tarrant County, and the study contractor on June 5, 1986, in the City of Fort Worth, to review the results of this study.

2.0 AREA STUDIED

2.1 Scope of Study

This Flood Insurance Study covers the unincorporated areas of Tarrant County, Texas. Not included in the study are: the City of Azle; the City of Blue Mound; the City of Fort Worth; the City of Haslet; the City of Lakeside; the City of River Oaks; the City of Lake Worth; the City of Saginaw; the City of Sansom Park Village; the City of Westworth Village; the Town of Westover Hills; the City of White Settlement; the City of Benbrook; the Town of Edgecliff Village; the City of Crowley; the City of Burleson; the City of Everman; the City of Forest Hill; the City of Kennedale; the City of Arlington; the City of Mansfield; the City of Grand Prairie; the City of Euless; the City of Bedford; the City of Hurst; the City of Richland Hills; the City of North Richland Hills; the City of Haltom City; the City of Watauga; the City of Keller; the Town of Colleyville; the City of South Lake; the City of West Lake; the City of Grapevine; and Carswell Air Force Base. The area of study is shown on the Vicinity Map (Figure 1).

The following streams were studied by detailed methods within the county boundary:

Ash Creek	- for its entire length;
Bear Creek 1	- from the downstream county boundary to approximately 400 feet upstream of Golden Triangle Spur;
Big Fossil Creek	- from the Fort Worth corporate limits to 100 feet upstream of the corporate limits
Boaz Creek	- for its entire length;

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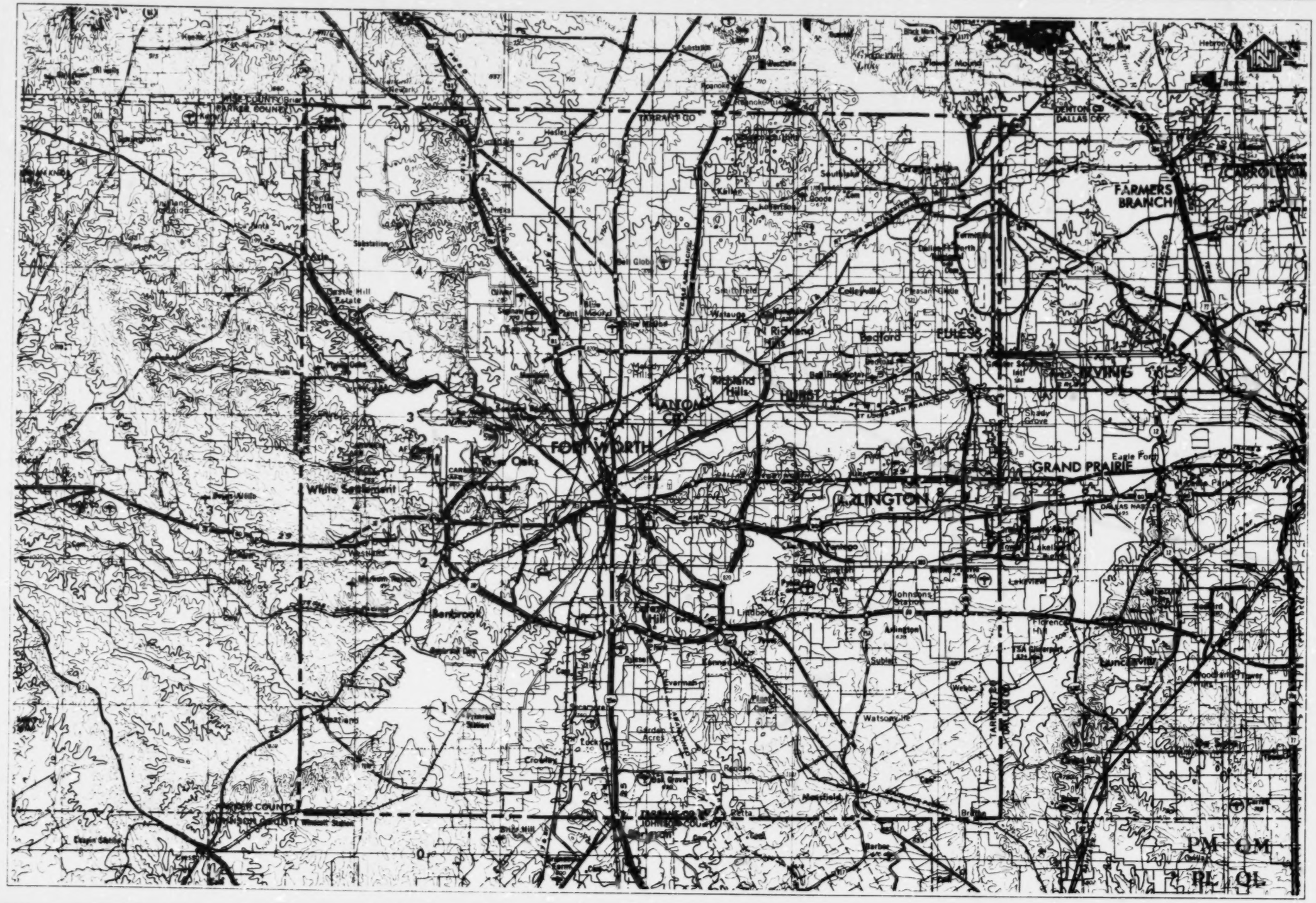

APPROXIMATE SCALE
0 4 8 12 MILES

VICINITY MAP

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FIGURE 1

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Briar Creek	- for its entire length;
Buffalo Creek	- from its confluence with Henrietta Creek to approximately 2.7 miles upstream of Harmon Road;
Chambers Creek	- for its entire length;
Deer Creek	- for its entire length;
Elm Branch	- for its entire length;
Henrietta Creek	- from approximately 100 feet downstream of White Chapel Road to approximately 0.45 mile upstream of Keller Haslet Road;
Low Branch	- from the downstream Mansfield corporate limits to approximately 880 feet upstream of the corporate limis;
Marys Creek	- from approximately 350 feet upstream of Loop 820 northbound to the confluence of Stream MSC-3, and from the Fort Worth corporate limits to approximately 0.51 mile upstream;
North Branch of Deer Creek	- from approximately 150 feet downstream of the county boundary to 120 feet upstream of county boundary;
North Creek	- from the county boundary to approximately 2,500 feet upstream of the county boundary;
Paschal Branch	- for its entire length;
South Fork of Deer Creek	- from the downstream county boundary to approximately 0.77 mile upstream of the county boundary;
South Fork of North Branch of Deer Creek	- from the downstream county boundary to approximately 1,400 feet upstream;
South Marys Creek	- for its entire length;
Stream BB-6	- for its entire length;
Stream BFC-2A	- from the county boundary to approximately 420 feet upstream of the county boundary;
Stream BFC-4	- from the downstream county boundary to approximately 1,000 feet upstream of the county boundary;
Stream CF-5	- for its entire length;
Stream HEN-1	- from the county boundary to approximately 1,200 feet upstream of the county boundary;
Stream HEN-2	- from the Atchison Topeka and Santa Fe Railway to approximately 0.44 mile upstream of the railroad;
Stream HEN-2A	- from the county boundary to approximately 410 feet upstream of the county boundary;

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Stream MSC-3	- from the county boundary to approximately 1,200 feet upstream of the county boundary;
Stream SC-7	- for its entire length;
Stream VC-3	- for its entire length;
Stream VC-4	- from approximately 400 feet downstream of the county boundary to approximately 1,700 feet upstream of the confluence of Stream VC-4A;
Stream VC-5	- for its entire length;
Stream VC-6	- for its entire length;
Stream VC-7	- for its entire length;
Stream WB-1	- from the downstream county boundary to approximately 50 feet upstream of the county boundary;
Sycamore Creek	- for its entire length;
Village Creek	- for its entire length;
Walnut Creek 1	- for its entire length;
Walnut Creek 2	- from approximately 1,000 feet downstream of the Texas and Pacific Railroad to approximately 2.2 miles upstream;
Walnut Creek 3	- from the downstream Mansfield corporate limits to approximately 1.6 miles upstream of the county boundary, and from aproximately 800 feet downstream of Retta Mansfield Road to approximately 500 feet upstream of the Tarrant County boundary;
West Fork Trinity River	- from the upstream side of State Route 360 to approximately 200 feet upstream of FM 57, and from approximately 1,000 feet downstream of Eagle Mountain Dam to the Tarrant County boundary;
Willow Branch	- for its entire length;
Whites Branch	- from approximately 2.2 miles upstream of the confluence with Big Fossil Creek to approximately 2.3 miles upstream of the confluence.

Benbrook Lake, Eagle Mountain Lake, Grapevine Lake, Joe Pool Lake, Lake Worth, and Marine Creek Lake were also studied by detailed methods for their entire shorelines within the county. The areas studied by detailed methods were selected with priority given to all known flood hazard areas and areas of projected development and proposed construction through March 1989.

The following streams were studied by approximate methods: Bear Creek 2; Big Fossil Creek; Bowman Branch; Boyd Branch; Carter Slough; Cement

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Creek; Clear Fork Trinity River; Cottonwood Branch; Dosier Creek; Dosier Slough; Dove Creek; Dutch Branch; Gilmore Branch; Henrietta Creek; Higgins Branch; Hogpen Branch; Indian Creek; Kirkwood Branch; Little Carter Slough; Little Dosier Creek; Live Oak Creek; Low Branch; Lynn Creek; Marine Creek; Marshall Branch; Marys Creek; McCann Branch; Mill Creek; Moss Branch; Mustang Creek; Rock Creek; Silver Creek; South Fork Kirkwood Branch; Stream BB-3; Stream BB-9; Stream BB-10; Stream BFC-1; Stream BFC-2; Stream BFC-4; Stream BFC-4A; Stream MC-2; Stream MSC-3; Stream VC-4; Stream WB-1; Swift Branch; West Jones Branch; and Whites Branch.

Information from HEC-2 models of streams in various incorporated communities within Tarrant County has been added to this Flood Insurance Study. Since the alignment of the cross sections used in these models was unavailable, approximate flooding was mapped for these streams assuming a cross section orientation that is perpendicular to flow. Listed below are the streams mapped by this method, and the incorporated community's Flood Insurance Study for which the data were developed: City of Euless: Boyd Branch; City of Fort Worth: Big Fossil Creek, Cement Creek, Marys Creek, Stream MC-2, Stream MSC-3, Whites Branch; City of Grapevine: Stream BB-3; City of Haslet: Henrietta Creek; City of Kennedale: Stream VC-4; City of Mansfield: Low Branch, Walnut Creek 3; and City of South Lake: Higgins Branch, Kirkwood Branch, South Fork Kirkwood Branch, Stream BB-9, West Jones Branch.

Approximate analyses were used to study those areas having a low development potential or minimal flood hazards. The scope and methods of study were proposed to, and agreed upon by, FEMA and Tarrant County.

2.2 Community Description

Tarrant County is located in north central Texas. It is bordered to the north by the unincorporated areas of Wise and Denton Counties, to the east by the unincorporated areas of Dallas County, to the south by the unincorporated areas of Ellis and Johnson Counties, and to the west by the unincorporated areas of Parker County. The land area contained within Tarrant County is approximately 861 square miles.

The population of Tarrant County in 1970 was 716,917 and in 1980 was 860,880 (References 1 and 2). These figures include all the incorporated cities in the county. The estimated 1980 unincorporated area population was 10,000.

Tarrant County is drained by the West Fork Trinity River and its tributaries. Tarrant has terrain characteristics of the Blackland Prairie. The unincorporated areas are undeveloped at this time, but this situation will be changing due to development pressures.

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The climatological data at Fort Worth are considered indicative of the conditions prevailing in the region. Average rainfall is 32.30 inches for the last 10-years. The maximum and minimum annual rainfall occurring during the last 57 years was 51.03 inches in 1932 and 17.91 inches in 1921, respectively. The mean relative humidity is 65 percent, and the average temperature is 65.8 degrees Fahrenheit (°F) (Reference 3).

2.3 Principal Flood Problems

Generally, the major floods experienced in Tarrant County are produced by heavy rainfall from frontal type storms which occur in the spring and summer months. Major flooding can be produced by the intense rainfall usually associated with localized thunderstorms. These thunderstorms may occur at any time during the year but are more prevalent in the spring and summer months.

Tarrant County has experienced a number of major flood events since its settlement in 1849. The following are brief descriptions of past flood events on several streams in Tarrant County. Although most of these descriptions relate to incorporated areas of Tarrant County, they are indicative of the flood potential in the unincorporated areas of Tarrant County.

A search of the historical information indicates that large flows occurred on the West Fork Trinity River in May 1866, May 1908, April 1922, June 1941, May 1949, May 1957, and November 1981. The May 1866 flood caused considerable damage along the Trinity River, but no specific data related to this flood are available.

The May 1908 flood produced a peak discharge of 184,000 cubic feet per second (cfs) on the West Fork Trinity River in Dallas County. Based on present conditions, a flood of this magnitude would have a recurrence interval of approximately once in 500 years.

Historical flood information on Marine Creek began in 1907; however, no stage elevation data are available. From the sources mentioned previously, it is known that large floods occurred on Marine Creek in 1908, April 1922, February 1938, April 1942, and 1957. The largest known flood occurred in April 1942, with an estimated discharge of 22,300 cfs.

Large floods occurred in the Bear Creek watershed in 1935, 1942, 1949, 1957, 1962, 1964, and 1966. Other lesser floods have occurred such as those on May 7, 1969, and June 1961, but little definite information is available on them.

Large floods occurred in the Big Fossil Creek watershed in September 1900, May 1908, April 1922, September 1932, April 1942, May 1949, May 1957, October 1959, June 1961, September 1962, September 1964, March 1968, and October 1981.

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Research indicates that major floods occurred on Village Creek in April 1922, May 1949, and April 1957. More moderate floods occurred in 1916, 1945, 1962, 1964, 1965, and 1968. Available information on other damaging floods has been lost in the obscurity of time or is generally inconclusive for study purposes.

Historical flood information on Walnut Creek 3 has been documented since about 1900. Since that date, the highest stage probably occurred on May 25, 1922 (stage unknown). Another large flood occurred on September 26-27, 1936, when 7.47 inches of rain fell in two days. The USGS established a water-stage recording gage on Walnut Creek 3 at County Road 2016 in September 1860. Since the installation of the gage, the highest stage of 559.1 feet was recorded during the floods of May 6-7, 1969, and June 4, 1973 (Reference 4).

Joe Pool Lake is a recently constructed reservoir that is located primarily in the City of Grand Prairie. It does, however, affect Tarrant County along Walnut Creek 3. This reservoir was designed for purposes of water supply and also to provide flood protection.

It is seldom possible to determine the conditions that existed at the sites of the historical high-water mark or discharge estimate. The hydrologic determinations for this study are based on existing stream and watershed conditions which may differ from the conditions that existed at the time of the historic flood. Additionally, the frequency of occurrence estimates that were mentioned previously may not be valid because the watersheds have changed from the time of historic floods.

2.4 Flood Protection Measures

Man-made reservoirs have significantly altered flood flows in the region. The major reservoirs are: Lake Worth, Eagle Mountain Lake, and Lake Bridgeport on the West Fork Trinity River; Benbrook Lake on the Clear Fork Trinity River; and Lake Arlington on Village Creek.

Other reservoirs in the region include Marine Creek Lake on Marine Creek, and Grapevine Lake on Lake Worth, owned by the City of Fort Worth, and Eagle Mountain Lake and Lake Bridgeport, owned and operated by TCWCID #1, do not contain storage space specifically allocated for flood control. These reservoirs are primarily designed and operated for water supply but do significantly reduce peak flows on the West Fork Trinity River.

Lake Arlington is owned and operated by the City of Arlington. This reservoir and its structure are also intended to provide a reliable water supply but do mininize storm flows in lower reaches of Village Creek.

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Benbrook Dam, a COE project, located on the Clear Fork Trinity River. It has provided flood control, water supply, and recreation in the form of Lake Benbrook for the Cities of Benbrook and Fort Worth since it was put into operation in 1952 (Reference 5).

The Fort Worth Floodway consists of channel improvements in portions of the Clear and West Forks of the Trinity River and Silver Creek. Combined channel and levee improvements provide protection for flows in excess of the base (100-year) flood.

Within Tarrant County there are over 50 channel improvement projects. Channelization will increase as pressure increases to develop all lands.

Nonstructural measures of flood protection in the form of land use regulations and ordinances are being used to aid in the prevention of future flood damage.

3.0 ENGINEERING METHODS

For the flooding sources studied in detail in the county, standard hydrologic and hydraulic study methods were used to determine the flood hazard data required for this study. Flood events of a magnitude which are expected to be equaled or exceeded once on the average during any 10-, 50-, 100-, or 500-year period (recurrence interval) have been selected as having special significance for flood plain management and for flood insurance rates. These events, commonly termed the 10-, 50-, 100-, and 500-year floods, have a 10, 2, 1, and 0.2 percent chance, respectively, of being equaled or exceeded during any year. Although the recurrence interval represents the long term average period between floods of a specific magnitude, rare floods could occur at short intervals or even within the same year. The risk of experiencing a rare flood increases when periods greater than 1 year are considered. For example, the risk of having a flood which equals or exceeds the 100-year flood (1 percent chance of annual exceedence) in any 50-year period is approximately 40 percent (4 in 10), and, for any 90-year period, the risk increases to approximately 60 percent (6 in 10). The analyses reported herein reflect flooding potentials based on conditions existing in the community at the time of completion of this study. Maps and flood elevations will be amended periodically to reflect future changes.

3.1 Hydrologic Analyses

Hydrologic analyses were carried out to establish the peak discharge-frequency relationships for each flooding source studied in detail affecting the county.

The computer program NUDALLAS was used in developing the hydrology for all streams studied by the COE, except West Fork Trinity River (Reference

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6). Watersheds were divided into subareas, and synthetic unit and flood hydrographs were developed at selected locations. Weather Bureau Technical Paper No. 40 and National Oceanic and Atmospheric Administration (NOAA) Technical Memorandum NWS Hydro-35 were used in developing the 10-, 50-, and 100-year frequency storms (References 7 and 8). The 500-year flood was based on extrapolated data. Peak discharge-frequency values were computed for selected locations. Routing of flood hydrographs through each subbasin reach, was accomplished using a modified PULS routing method. The HEC-2 backwater model provided the elevation-discharge-storage relationships for these studied streams (Reference 9).

On the West Fork Trinity River, the LRD-1 model provided the elevation-discharge-storage relationships (References 9 and 10).

For Deer Creek and its tributaries, numerous headwater areas of less than 2 square miles were modeled using the rational method, where Q=CIA. The variables in this method are defined as follows: Q is the peak discharge in cfs, C is a runoff coefficient. I is the rainfall intensity in inches per hour for the watershed time of concentration, and A is the drainage area in acres. The decrease in peak discharge with an increase in drainage area for some streams is due to watershed shape and/or overbank storage effects (Reference 7).

For the remaining streams studied by detailed methods, the hydrologic analyses were taken from the Flood Insurance Studies for the Cities of Mansfield, Benbrook, Crowley, Burleson, Fort Worth, Haslet, Azle, and South Lake (References 4, 5, 11, 12, 13, 14, 15, and 16).

A summary of drainage area-peak discharge relationships for the streams studied by detailed methods is shown in Table 1, "Summary of Discharges." Discharges were decreased due to storage routing for Marys Creek and North Creek.

TABLE 1 - SUMMARY OF DISCHARGES

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
ASH CREEK					
At Eagle Mountain Lake above confluence of Paschal Branch	25.92	11,200	17,100	20,200	28,000
BEAR CREEK 1					
At State Route 121	30.26	9,400	15,100	18,300	24,500
At FM 1938	17.77	8,600	13,500	15,800	20,500

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BEAR CREEK 1 (continued)					
At Texas and Pacific railroad	6.35	5,900	8,500	9,700	12,000
Approximately 1,300 feet upstream of Alta Vista Road	2.63	3,300	4,600	5,200	6,400
Approximately 1,400 feet upstream of Alta Vista Road	1.80	2,200	3,100	3,600	4,400
BIG FOSSIL CREEK					
Approximately 750 feet downstream of Wagley-Robertson Road	4.73	4,550	6,150	6,900	8,600
BOAZ CREEK					
Approximately 1,500 feet upstream of confluence with Walnut Creek 2	1.63	2,200	3,100	3,500	4,300
BRIAR CREEK					
Approximately 1,900 feet downstream from Liberty School Road	7.72	6,150	8,850	10,150	12,900
Approximately 1,600 feet upstream from Liberty School Road	6.66	5,700	8,050	9,200	11,650
Approximately 1,300 feet upstream of FM 730 (Boyd Road)	5.34	5,400	7,700	8,700	10,750
BUFFALO CREEK					
At confluence with Henrietta Creek	4.70	4,300	6,200	7,050	8,800
Approximately 5,600 feet upstream of Harmon Road	1.87	2,450	3,400	3,900	4,800
CHAMBERS CREEK					
At confluence with Village Creek	7.02	6,450	9,000	10,150	13,250
At Anglin Drive	6.56	6,400	8,700	9,750	12,650

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
DEER CREEK					
At confluence with Village Creek	21.43	15,200	21,600	24,700	30,400
ELM BRANCH					
At confluence with Village Creek	2.63	3,200	4,350	4,950	6,350
Approximately 1,900 feet upstream of Wilson Road	2.34	2,850	3,900	4,400	5,600
At Rendon Road	0.58	950	1,250	1,400	1,750
HENRIETTA CREEK					
Approximately 100 feet below confluence of Buffalo Creek	24.50	16,600	24,200	27,850	35,250
Approximately 100 feet above confluence of Stream HEN-2	7.91	6,900	10,150	11,300	13,850
LOW BRANCH					
At old State Route 287	0.7	1,700	2,200	2,400	3,050
MARYS CREEK					
Approximately 4,000 feet downstream of Loop 820	40.83	22,900	32,900	37,900	47,900
Approximately 1,000 feet upstream of FM 2871 (Chapin School Road)	35.54	25,600	35,300	40,400	50,800
Approximately 1,200 feet upstream of U. S. Route 80	25.01	18,900	26,300	30,300	37,700
NORTH BRANCH OF DEER CREEK					
Above South Fork of North Branch	1.98	2,800	3,900	4,350	5,500
NORTH CREEK					
At confluence with Village Creek	2.98	2,850	4,150	4,850	6,150
At confluence of right bank tributary approximately 4,500 feet downstream of Interstate 35	2.05	1,750	2,800	3,200	4,050
At Interstate 35	1.76	2,200	3,150	3,950	4,350

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
PASCHAL BRANCH					
At confluence with Ash Creek	1.91	2,650	3,650	4,100	5,000
SOUTH FORK OF DEER CREEK					
At confluence with Deer Creek	4.32	5,100	7,000	7,800	9,900
SOUTH FORK OF NORTH BRANCH OF DEER CREEK					
At confluence with North Branch	2.82	3,750	5,100	5,700	7,200
SOUTH MARYS CREEK					
At confluence with Marys Creek	9.33	8,900	12,600	14,200	17,600
At Link Hill Drive	6.27	8,100	10,900	12,200	15,400
Approximately 5,600 feet upstream of Link Hill Drive	3.38	4,400	5,900	6,600	8,400
STREAM BB6					
At confluence with Bear Creek 1	1.87	1,950	2,750	3,100	3,950
STREAM BFC-2A					
At confluence of Stream BFC-2	2.62	2,500	3,400	3,800	4,750
STREAM BFC-4					
Approximately 10 feet upstream of Hicks Road	1.85	3,000	4,000	4,400	5,550
STREAM CF-5					
At confluence of old Clear Fork streambed	3.83	4,700	6,250	6,800	7,800
STREAM HEN-1					
At confluence with Henrietta Creek	1.41	1,800	2,400	2,700	3,300

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
STREAM HEN-2					
At confluence of Stream HEN-2A/at Atchison, Topeka, and Santa Fe Railway	6.58	5,700	8,000	9,050	11,200
STREAM HEN-2A					
At confluence with Stream HEN-2	1.47	1,800	2,500	2,850	3,550
STREAM MSC-3					
Approximately 10 feet upstream of Interstate 30	1.6	2,400	3,250	3,600	4,550
STREAM SC-7					
At Atchison, Topeka, and Santa Fe Railway	2.21	1,920	3,000	3,450	4,680
STREAM VC-3					
At a point approximately 800 feet upstream of northern corporate limits of the City of Kennedale	1.1	1,400	2,010	2,240	2,860
STREAM VC-4					
At a point approximately 100 feet upstream of confluence of Stream VC-4A	3.1	2,860	3,990	4,500	5,660
STREAM VC-5					
At confluence with Village Creek	3.66	2,650	3,850	4,400	5,500
At abandoned Missouri Pacific Railroad bed	2.83	2,850	3,950	4,450	5,550
STREAM VC-6					
At confluence with Village Creek	2.08	2,240	3,170	3,590	4,570
At East Oak Grove Road	1.66	2,020	2,810	3,160	4,010

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
STREAM VC-7					
At confluence with Village Creek	1.90	1,800	2,500	2,950	3,800
STREAM WB-1					
Approximately 3,900 feet upstream from confluence with Whites Branch	1.81	2,900	3,850	4,250	5,400
SYCAMORE CREEK					
At confluence with Village Creek	1.36	1,400	2,100	2,400	3,300
VILLAGE CREEK					
At Southern Pacific Railroad	113.59	28,500	44,900	56,100	77,400
Approximately 3,600 feet downstream from Everman-Kennedale--Burleson Road	100.77	28,100	44,300	54,450	73,950
Approximately 4,500 feet downstream of FM 1187	63.78	20,050	33,350	39,800	52,750
Approximately 6,400 feet upstream from Hargrove	31.65	10,700	15,600	18,450	25,000
WALNUT CREEK 1					
At Eagle Mountain Lake	80.72	22,500	37,000	44,900	61,800
At U. S. Route 730	76.01	22,400	36,800	44,300	60,600
WALNUT CREEK 2					
Approximately 500 feet upstream of confluence with Marys Creek	10.1	7,900	11,000	12,600	16,100
WALNUT CREEK 3					
Above the confluence of Willow Branch	38.5	11,100	19,000	22,800	29,800
WEST FORK TRINITY RIVER					
Below Eagle Mountain dam	1,970	9,200	21,900	31,900	56,300
Below Lake Worth Dam	2,064	9,100	21,600	31,500	55,600
At confluence of Marine Creek	2,616	17,000	38,000	54,000	95,500

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TABLE 1 - SUMMARY OF DISCHARGES - continued

FLOODING SOURCE AND LOCATION	DRAINAGE AREA (sq. miles)	PEAK DISCHARGES (cfs) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
WEST FORK TRINITY RIVER (continued)					
At confluence of Sycamore Creek	2,648	17,500	39,000	55,000	98,300
At confluence of Big Fossil Creek	2,708	19,500	43,500	60,500	118,000
At confluence of Village Creek	2,794	23,000	50,000	68,000	133,000
At Route 360	3,065	27,000	57,000	76,500	148,000
WHITES BRANCH					
At confluence with Big Fossil Creek	10.43	7,200	10,100	11,500	14,700
WILLOW BRANCH					
At confluence of Walnut Creek 3	9.8	4,690	7,190	8,360	10,650

The hydrologic analysis used in studying the detailed study streams was also used to establish the 10-, 50-, 100-, and 500-year flood elevations on Marine Creek Lake and Grapevine Lake. Data for Eagle Mountain Lake were provided by TCWCID #1. An elevation frequency curve for Lake Worth was developed using storage routing and existing data from Eagle Mountain Lake.

The flooding analysis used to determine the stillwater elevations for Joe Pool Lake was taken from COE Design Memorandum No. 1 on Lakeview Reservoir (Joe Pool Lake) (Reference 17).

For Lake Arlington, a graphical frequency analysis of the maximum annual elevations for its historical period of record was performed. If Lake Arlington had been full instead of empty at the beginning of the 1957 flood (upon completion of the dam), the maximum water surface for 1957 would have been much higher. Pool-elevation frequency data were adopted for Lake Arlington based on routing synthetic frequency flood hydrographs through Lake Arlington, starting each event at the service spillway elevation. Although Lake Arlington serves to reduce discharges on Village Creek, flooding from Lake Arlington does not affect the unincorporated areas of Tarrant County. Therefore, no elevation information for Lake Arlington is supplied in this study.

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The analysis for Benbrook Lake was performed in this fashion: the Clear Fork Trinity River at Fort Worth stream gage was installed in 1924. Construction of Benbrook Dam began in 1947 with delibrate impoundment commencing in 1952. Daily gage flows were adjusted to the location of Benbrook Dam for 1924 and 1952 and were routed as if the dam had been in place during that time period. Observed elevations and outflows are available for the period 1952 to 1973. A pool elevation frequency curve was developed based on the above 50-year period of record. The pool elevation frequency curve, considered with reservoir regulation procedures for Benbrook Lake, indicates a 6,000 cfs release rate for the 10-, 50-, 100-year floods. The 500-year and standard project floods discussed in this report under frequency floods were routed through Benbrook Dam. For both floods, a starting water-surface elevation of 706.5 mean sea level (msl), one-third of flood control, was used. Maximum water surface elevations computed in this flood routing were adopted for the 500-year and standard project floods.

The stillwater elevations for the 10-, 50-, 100-, and 500-year floods have been determined for Benbrook Lake, Eagle Mountain Lake, Grapevine Lake, Joe Pool Lake, Lake Worth, and Marine Creek Lake are summarized in Table 2. The analyses reported herein reflect the stillwater elevations and do not include the contributions from wave action effects. The addditional hazard due to wave action effects should be considered in future development.

TABLE 2 - SUMMARY OF STILLWATER ELEVATIONS

FLOODING SOURCE AND LOCATION	ELEVATION (feet) 10-YEAR	50-YEAR	100-YEAR	500-YEAR
BENBROOK LAKE				
At dam	704.8	712.2	715.0	727.0
EAGLE MOUNTAIN LAKE				
At dam	653.0	655.9	657.4	665.4
GRAPEVINE LAKE				
At dam	554.0	562.3	564.0	568.4
JOE POOL LAKE				
At dam	527.6	536.0	537.5	543.5
LAKE WORTH				
At dam	596.5	598.8	599.9	602.7
MARINE CREEK LAKE				
At dam	691.6	695.0	698.4	702.3

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3.2 Hydraulic Analyses

Analyses of the hydraulic characteristics of flooding from the sources studied were carried out to provide estimates of the elevations of floods of the selected recurrence intervals.

Cross section data for the backwater analyses were field surveyed and were located at close intervals above or below bridges and culverts in order to compute the significant backwater effects of these structures. All bridges and culverts were surveyed to obtain elevation data and structural geometry.

Locations of selected cross sections used in the hydraulic analyses are shown on the Flood Profiles (Exhibit 1). Along certain portions of Walnut Creek 1, a profile base line is shown on the maps to represent channel distances as indicated on the flood profiles and floodway data tables. For stream segments for which a floodway was computed (Section 4.2), selected cross section locations are also shown on the Flood Boundary and Floodway Map (Exhibit 2).

Water-surface elevations of floods of the selected recurrence intervals were computed for all streams studied, except the West Fork Trinity River, using the COE HEC-2 step-backwater computer program. All streams were studied using the 1981 edition of the HEC-2 model except North Branch of Deer Creek, South Fork of Deer Creek, South Fork of North Branch of Deer Creek, and Stream BB-6, for which the 1972 version of HEC-2 was used in the analyses; and Boaz Creek for which the 1968 version was used (References 9, 18, and 19). Flood profiles were drawn showing computed water-surface elevations for floods of the selected recurrence intervals. The West Fork Trinity River was studied using the COE HEC-2 and LRD-1 model (References 9 and 10). Starting water-surface elevations for the streams studied by detailed methods were calculated using the slope/area method.

The Interstate 35 West bridge over Buffalo Creek is not large enough to carry the less frequent flows. This condition causes the water to split to the north into Henrietta Creek. A split flow analysis was used in determining the water-surface elevation on Buffalo Creek and Henrietta Creek upstream from Interstate 35.

Channel and overbank roughness factors (Manning's "n") used in the hydraulic computations were chosen by engineering judgment and were based on field observations of the stream and flood plain areas. The channel "n" and overbank "n" values for the streams studied by detailed methods are shown in the following tabulation.

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Stream Name	Channel "n"	Overbank "n"
Ash Creek	0.035 - 0.060	0.055 - 0.080
Bear Creek 1	0.050 - 0.065	0.065 - 0.080
Big Fossil Creek	0.035 - 0.065	0.050 - 0.120
Boaz Creek	0.080	0.065
Briar Creek	0.050 - 0.055	0.070 - 0.080
Buffalo Creek	0.045 - 0.060	0.065
Chambers Creek	0.045 - 0.055	0.065 - 0.075
Deer Creek	0.045 - 0.065	0.055 - 0.100
Elm Branch	0.060 - 0.075	0.075 - 0.085
Henrietta Creek	0.050 - 0.065	0.060 - 0.075
Low Branch	0.045 - 0.065	0.065 - 0.070
Marys Creek	0.050 - 0.065	0.060 - 0.085
North Branch of Deer Creek	0.050 - 0.060	0.060 - 0.075
North Creek	0.050 - 0.070	0.050 - 0.080
Paschal Branch	0.045 - 0.075	0.070 - 0.095
South Fork of Deer C[illegible]	0.060	0.060
South Fork of North Branch of Deer Creek	0.060	0.060
South Marys Creek	0.045 - 0.070	0.070 - 0.090
Stream BFC-2A	0.060	0.080
Stream BFC-4	0.050	0.075
Stream CF-5	0.013 - 0.065	0.045 - 0.100
Stream HEN-1	0.055 - 0.065	0.065 - 0.075
Stream HEN-2	0.050	0.060
Stream HEN-2A	0.060 - 0.065	0.050
Stream MSC-3	0.045 - 0.060	0.050 - 0.075
Stream SC-7	0.045 - 0.060	0.070
Stream VC-3	0.050 - 0.060	0.055 - 0.070
Stream VC-4	0.055 - 0.060	0.065 - 0.080
Stream VC-5	0.050 - 0.060	0.060 - 0.085
Stream VC-6	0.040 - 0.065	0.050 - 0.090
Stream VC-7	0.050 - 0.060	0.070 - 0.080
Sycamore Creek	0.035 - 0.060	0.050 - 0.085
Tributary BB 6	0.070	0.070
Village Creek	0.035 - 0.055	0.070 - 0.100
Walnut Creek 1	0.040 - 0.085	0.050 - 0.090
Walnut Creek 2	0.075 - 0.085	0.040 - 0.055
Walnut Creek 3	0.035 - 0.065	0.050 - 0.070
West Fork Trinity River	0.030 - 0.060	0.055 - 0.100
Willow Branch	0.030 - 0.055	0.085
Whites Br[illegible]ch	0.050 - 0.065	0.070 - 0.085

All elevations are referenced to the National Geodetic Vertical Datum of 1929 (NGVD). Elevation reference marks used in this study are shown on the maps.

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The hydraulic analyses for this study were based on unobstructed flow. The flood elevations shown on the profiles are thus considered valid only if hydraulic structures remain unobstructed, operate properly, and do not fail.

4.0 FLOOD PLAIN MANAGEMENT APPLICATIONS

The National Flood Insurance Program encourages State and local governments to adopt sound flood plain management programs. Therefore, each Flood Insurance Study produces maps designed to assist communities in developing flood plain management measures.

4.1 Flood Boundaries

To provide a national standard without regional discrimination, the 1 percent annual chance (100-year) flood has been adopted by FEMA as the base flood for flood plain management purposes. The 0.2 percent annual chance (500-year) flood is employed to indicate additional areas of flood risk in the community. For the streams and lakes studied in detail, the 100- and 500-year flood plain boundaries have been delineated using the flood elevations determined at each cross section. Between cross sections, the boundaries were interpolated using topographic maps (Reference 20).

In addition, flood boundaries from selected detailed study streams within incorporated communities in Tarrant County have been added to this study using the Flood Insurance Studies for the Cities of Arlington, Burleson, Fort Worth, Mansfield, Benbrook, North Richland Hills, White Settlement, Grapevine, Haslet, Watauga, and Keller; and the Towns of Westworth Village and Colleyville (References 20, 12, 13, 4, 5, 22, 23, 24, 14, 25, 26, 27, and 28).

For the streams studied by approximate methods, the 100-year flood plain boundaries were drawn using topographic maps, drainage areas, flood hazard boundary maps, engineering judgment, and Flood Insurance Studies for the Cities of South Lake, Grapevine, Haslet, Fort Worth, Kennedale, Mansfield, Forest Hill, Arlington, and Euless (References 19 29, 16, 24, 14, 13, 30, 4, 31, 21, and 32).

The 100- and 500-year flood plain boundaries are shown on the Flood Boundary and Floodway Map (Exhibit 2). In cases where the 100- and 500-year flood plain boundaries are close together, only the 100-year flood plain boundary has been shown. Small areas within the flood plain boundaries may lie above the flood elevations but cannot be shown due to limitations of the map scale and/or lack of detailed topographic data.

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4.2 Floodways

Encroachment on flood plains, such as structures and fill, reduces flood-carrying capacity, increases flood heights and velocities, and increases flood hazards in areas beyond the encroachment itself. One aspect of flood plain management involves balancing the economic gain from flood plain development against the resulting increase in flood hazard. For purposes of the National Flood Insurance Program, a floodway is used as a tool to assist local communities in this aspect of flood plain management. Under this concept, the area of the 100-year flood plain is divided into a floodway and a floodway fringe. The floodway is the channel of a stream, plus any adjacent flood plain areas, that must be kept free of encroachment so that the 100-year flood can be carried without substantial increases in flood heights. Minimum federal standards limit such increases to 1.0 foot, provided that hazardous velocities are not produced. The floodways in this study are presented to local agencies as minimum standards that can be adopted directly or that can be used as a basis for additional floodway studies.

The floodways presented in this study were computed on the basis of equal conveyance reduction from each side of the flood plain. The results of these computations are tabulated at selected cross sections for each stream segment for which a floodway is computed (Table 3). Since no cross sections appear in the community on North Creek, Big Fossil Creek, Boaz Creek, BFC-2A, Stream BB-6, Stream MSC-3, Stream CF-5, Low Branch, Whites Branch, and Walnut Creek 2, no floodway data tables were computed.

As shown on the Flood Boundary and Floodway Map (Exhibit 2), the floodway boundaries were computed at cross sections. Between cross sections, the boundaries were interpolated. In cases where the floodway and 100-year flood plain boundaries are either close together or collinear, only the floodway boundary has been shown. Floodway widths for Ash Creek, Bear Creek 1, Henrietta Creek, Marys Creek, Paschal Branch, Stream SC-7, Stream VC-4, Stream VC-7, Village Creek, Walnut Creek 1, Walnut Creek 3, and the West Fork Trinity River extend beyond the county boundary.

The area between the floodway and 100-year flood plain boundaries is termed the floodway fringe. The floodway fringe encompasses the portion of the flood plain that could be completely obstructed without increasing the water-surface elevation of the 100-year flood by more than 1.0 foot at any point. Typical relationships between the floodway and the floodway fringe and their significance to flood plain development are shown in Figure 2.

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Ash Creek								
A	8,080[1]	650/60[3]	4,352	4.6	657.4	654.9[4]	655.6	0.7
B	11,600[1]	900/860[3]	6,226	3.2	663.4	663.4	664.4	1.0
C	13,250[1]	761	5,433	3.7	666.9	666.9	667.9	1.0
D	14,780[1]	460	3,569	5.6	671.6	671.6	672.2	0.6
Bear Creek 1								
A	109,530[1]	775/140[3]	5,778	3.2	579.1	579.1	579.8	0.7
B	110,690[1]	508/120[3]	3,687	5.0	581.5	581.5	582.3	0.8
C	113,570[1]	700/125[3]	5,733	3.2	587.2	587.2	587.9	0.7
D	115,740[1]	720/415[3]	5,178	3.3	590.5	590.5	591.3	0.8
E	169,640[1]	500	1,537	3.8	702.9	702.9	703.4	0.5
F	172,700[1]	700	1,628	3.6	715.3	715.3	715.9	0.6
G	176,050[1]	400	1,531	3.4	730.2	730.2	731.0	0.8
H	178,850[1]	300	965	3.7	745.6	745.6	746.5	0.9
I	181,620[1]	210	728	4.1	759.7	759.7	760.6	0.9
Briar Creek								
A	6,320[2]	825	6,018	1.7	661.8	661.8	662.6	0.8
B	7,425[2]	629	2,466	4.0	666.0	666.0	666.1	0.1
C	9,075[2]	499	2,327	4.0	672.0	672.0	672.7	0.7
D	10,480[2]	350	1,990	4.6	677.8	677.8	678.7	0.9
E	12,075[2]	250	1,426	6.5	685.7	685.7	686.4	0.7
F	13,850[2]	275	2,151	4.0	696.6	696.6	696.8	0.2

[1]Feet above confluence with West Fork Trinity River
[2]Feet above confluence with Eagle Mountain Lake
[3]Width/width within county boundary
[4]Elevation computed without consideration of backwater from Eagle Mountain Lake

TABLE 8

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

FLOODWAY DATA

ASH CREEK — BEAR CREEK 1 — BRIAR CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Buffalo Creek								
A	7,715[1]	190	903	4.7	661.2	661.2	662.2	1.0
B	8,870[1]	160	1,073	3.9	669.7	669.7	670.3	0.6
C	11,610[1]	200	961	4.4	676.3	676.3	677.2	0.9
D	13,060[1]	310	1,641	2.6	679.1	679.1	680.1	1.0
E	15,550[1]	199	738	5.3	689.9	689.9	690.3	0.4
F	17,520[1]	190	617	3.0	697.7	697.7	698.6	0.9
G	18,900[1]	130	394	4.7	704.2	704.2	705.0	0.8
H	20,330[1]	149	642	3.3	709.4	709.4	710.3	0.9
I	22,180[1]	170	539	4.0	719.4	719.4	720.3	0.9
J	23,280[1]	160	708	3.0	723.0	723.0	723.8	0.8
Chambers Creek								
A	3,610[2]	216	1,150	8.8	589.9	589.9	590.3	0.4
Deer Creek								
A	4,270[2]	599	4,910	5.0	640.6	640.6	641.3	0.7
Elm Branch								
A	2,380[2]	450	1,479	3.3	599.7	599.7	600.4	0.7
B	3,660[2]	80	1,129	4.4	613.4	613.4	614.2	0.8
C	4,910[2]	119	712	6.2	618.5	618.5	619.4	0.9
D	5,730[2]	47	545	3.7	624.0	624.0	624.5	0.5
E	7,330[2]	130	313	6.4	643.9	643.9	644.3	0.4
F	8,830[2]	80	384	3.6	659.5	659.5	660.3	0.8

[1]Feet above confluence with Henrietta Creek
[2]Feet above confluence with Village Creek

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

BUFFALO CREEK — CHAMBERS CREEK — DEER CREEK — ELM BRANCH

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Paschal Branch								
A	2,600[1]	60/30[6]	577	6.2	677.8	677.8	678.5	0.7
B	3,600[1]	39	354	10.2	687.1	687.1	687.1	0.0
South Fork of Deer Creek								
A	6,450[2]	274	1,193	5.95	782.7	782.7	783.4	0.7
B	8,250[2]	322	1,705	4.16	790.8	790.8	791.8	1.0
C	9,200[2]	248	1,229	5.78	794.7	794.7	795.6	0.9
South Fork of North Branch of Deer Creek								
A	4,710[3]	129	1,146	4.97	769.4	769.4	770.2	0.8
South Marys Creek								
A	1,220[4]	250	2,108	6.7	712.4	712.4	713.4	1.0
B	5,630[4]	350	2,107	6.7	738.1	738.1	738.9	0.8
C	11,540[4]	200	2,375	5.1	774.6	774.6	775.6	1.0
D	12,965[4]	150	1,391	8.8	783.1	783.1	783.5	0.4
E	14,420[4]	250	2,049	6.0	797.1	797.1	797.7	0.6
F	17,450[4]	99	938	7.1	813.5	813.5	813.8	0.3
Stream BFC-4								
A	16,800[5]	270	1,432	1.4	732.7	732.7	733.7	1.0

[1]Feet above confluence with Ash Creek
[2]Feet above confluence with Deer Creek
[3]Feet above confluence with North Branch of Deer Creek
[4]Feet above confluence with Marys Creek
[5]Feet above confluence with Big Fossil Creek
[6]Width/width within county boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

PASCHAL BRANCH — SOUTH FORK OF DEER CREEK — SOUTH FORK OF NORTH BRANCH OF DEER CREEK — SOUTH MARYS CREEK — STREAM BFC-4

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Stream HEN-1								
A	1,920[1]	230	950	2.8	668.9	668.9	669.9	1.0
B	2,730[1]	200	633	4.3	671.9	671.9	672.9	1.0
Stream HEN-2								
A	5,000[1]	350	2,585	3.5	702.6	702.6	703.0	0.4
B	6,490[1]	275	1,309	6.9	706.6	706.6	707.5	0.9
Stream HEN-2A								
A	7,480[2]	140	542	4.9	735.3	735.3	736.1	0.8
Stream SC-7								
A	12,720[3]	200/180[5]	783	4.4	761.2	761.2	762.0	0.8
Stream VC-3								
A	3,800[4]	90	462	7.4	574.9	574.9	575.2	0.3
B	4,730[4]	81	597	5.7	580.6	580.6	581.5	0.9
Stream VC-4								
A	9,000[4]	177/102[5]	1,201	5.2	602.4	602.4	603.3	0.9

[1]Feet above confluence with Henrietta Creek
[2]Feet above confluence with Stream HEN-2
[3]Feet above confluence with Sycamore Creek
[4]Feet above confluence with Village Creek
[5]Width/width within county boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

STREAM HEN-1 — STREAM HEN-2 — STREAM HEN-2A
STREAM SC-7— STREAM VC-3 — STREAM VC-4

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
						(FEET NGVD)		
Stream VC-5								
A	3,200[1]	310	1,026	4.3	604.9	604.9	605.9	1.0
B	5,280[1]	180	926	4.8	615.7	615.7	616.6	0.9
C	6,800[1]	151	868	5.1	622.0	622.0	622.7	0.7
D	8,310[1]	179	881	5.0	627.9	627.9	628.5	0.6
E	10,650[1]	180	1,071	4.1	636.1	636.1	636.8	0.7
F	14,330[1]	200	1,111	4.0	646.9	646.9	647.7	0.8
Stream VC-6								
A	5,050[1]	460	1,509	2.4	637.6	637.6	638.6	1.0
Stream VC-7								
A	2,910[1]	109	476	6.2	644.6	644.6	644.8	0.2
B	4,040[1]	150/20[5]	1,018	2.9	649.2	649.2	649.9	0.7
Stream WB-1								
A	4,855[2]	320	1,164	3.7	666.3	666.3	667.3	1.0
Sycamore Creek								
A	74,820[3]	149	549	4.4	762.1	762.1	762.8	0.7
Village Creek								
A	65,140[4]	1470/400[5]	17,036	3.3	573.2	573.2	573.9	0.7
B	67,660[4]	1530/340[5]	15,114	3.7	574.9	574.9	575.9	1.0

[1]Feet above confluence with Village Creek
[2]Feet above confluence with Whites Branch
[3]Feet above confluence with West Fork Trinity River
[4]Feet above confluence with West Fork Trinity River
[5]Width/width within county boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

STREAM VC-5 — STREAM VC-6 — STREAM VC-7 — STREAM WB-1 — SYCAMORE CREEK — VILLAGE CREEK

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Village Creek (continued)								
C	73,550[1]	1,840	10,263	5.3	582.1	582.1	582.1	0.0
D	79,070[1]	2,001	15,288	3.6	590.3	590.3	591.1	0.8
E	84,520[1]	1,600	12,267	4.4	598.2	598.2	599.2	1.0
F	86,600[1]	1,400	13,124	4.1	602.4	602.4	603.3	0.9
G	90,600[1]	1,500	12,295	4.4	608.2	608.2	609.1	0.9
H	95,230[1]	1,600	15,656	3.5	617.9	617.9	618.5	0.6
I	100,070[1]	1,177	13,065	4.2	627.9	627.9	628.1	0.2
J	107,400[1]	1,700	11,596	3.4	640.3	640.3	641.1	0.8
K	110,700[1]	1,100	9,057	4.4	645.8	645.8	646.5	0.7
L	114,280[1]	1,250	11,717	3.4	650.5	650.5	651.4	0.9
M	116,150[1]	1,000	7,963	5.0	654.6	654.6	655.1	0.5
N	120,640[1]	1,700	10,599	3.5	658.1	658.1	659.0	0.9
O	125,670[1]	1000/290[3]	3,031	6.1	665.3	665.3	665.5	0.2
Walnut Creek 1								
A	16,420[2]	1899/520[3]	12,940	3.5	657.4	654.9[4]	655.9	1.0
B	22,660[2]	1,520	15,454	2.9	667.4	667.4	668.2	0.8

[1]Feet above confluence with Trinity River

[2]Feet above confluence with West Fork Trinity River

[3]Width/width within county boundary

[4]Elevation computed without consideration of backwater from Mountain Lake

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

VILLAGE CREEK — WALNUT CREEK 1

BEST COPY AVAILABLE

FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Walnut Creek 3								
A	86,660[1]	1050/30[4]	7,458	3.1	601.6	601.6	602.5	0.9
B	88,750[1]	916/36[4]	6,442	3.5	604.3	604.3	605.3	1.0
C	90,380[1]	1126/1086[4]	8,768	2.6	606.8	606.8	607.5	0.7
West Fork Trinity River								
A	90,840[2]	3469/3250[4]	43,726	1.75	463.6	463.6	464.4	0.8
B	98,680[2]	4800/4250[4]	72,325	1.06	464.8	464.8	465.5	0.7
Willow Branch								
A	5,080[3]	397	1,935	4.3	603.4	603.4	604.4	1.0
B	5,810[3]	360	2,606	3.1	606.0	606.0	607.0	1.0
C	10,000[3]	433	2,489	3.2	619.7	619.7	620.7	1.0
D	11,190[3]	314	1,462	5.5	623.8	623.8	624.6	0.8

[1]Feet above confluence with Joe Pool Lake
[2]Feet above confluence with Trinity River
[3]Feet above confluence with Walnut Creek 3
[4]Width/width within county boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

WALNUT CREEK 3 — WEST FORK TRINITY RIVER — WILLOW BRANCH

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FLOODING SOURCE		FLOODWAY			BASE FLOOD WATER SURFACE ELEVATION			
CROSS SECTION	DISTANCE	WIDTH (FEET)	SECTION AREA (SQUARE FEET)	MEAN VELOCITY (FEET PER SECOND)	REGULATORY	WITHOUT FLOODWAY	WITH FLOODWAY	INCREASE
					(FEET NGVD)			
Henrietta Creek								
A	41,330[1]	570/50[4]	4,351	5.0	683.0	683.0	684.0	1.0
B	42,700[1]	330	3,644	3.1	692.3	692.3	692.5	0.2
Marys Creek								
A	22,060[2]	700/220[4]	7,725	4.9	678.0	678.0	678.0	0.0
B	26,600[2]	780/550[4]	6,092	6.3	691.1	691.1	691.9	0.8
C	27,800[2]	690/260[4]	4,916	7.8	694.7	694.7	695.5	0.8
D	28,440[2]	445/160[4]	5,658	6.7	701.3	701.3	701.8	0.5
E	30,330[2]	450/150[4]	4,689	8.6	705.2	705.2	705.7	0.5
F	32,400[2]	739/540[4]	6,927	4.4	712.1	712.1	712.3	0.2
G	33,230[2]	799/620[4]	6,102	5.0	713.3	713.3	713.7	0.4
H	34,970[2]	710/310[4]	4,664	6.6	722.4	722.4	722.4	0.0
I	41,000[2]	490	3,887	7.7	741.7	741.7	742.7	1.0
North Branch of Deer Creek								
A	14,020[3]	139	821	4.69	765.9	765.9	766.8	0.9

[1]Feet above confluence with Elizabeth Creek
[2]Feet above confluence with Clear Fork of West Fork Trinity River
[3]Feet above confluence with Deer Creek
[4]Width/width within county boundary

TABLE 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOODWAY DATA

HENRIETTA CREEK-MARYS CREEK-NORTH BRANCH OF DEER CREEK

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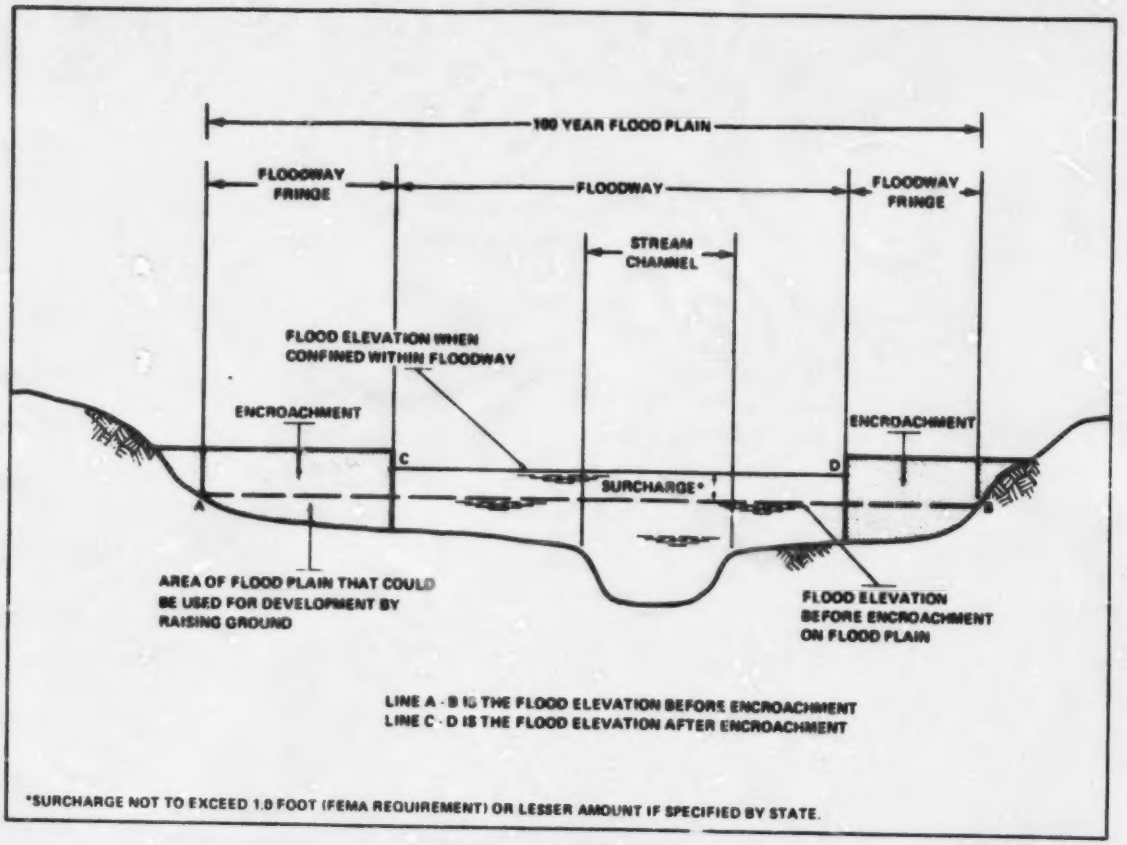
100 YEAR FLOOD PLAIN
FLOODWAY FRINGE
FLOODWAY
FLOODWAY FRINGE
STREAM CHANNEL
FLOOD ELEVATION WHEN CONFINED WITHIN FLOODWAY
ENCROACHMENT
ENCROACHMENT
C
D
SURCHARGE*
A
B
AREA OF FLOOD PLAIN THAT COULD BE USED FOR DEVELOPMENT BY RAISING GROUND
FLOOD ELEVATION BEFORE ENCROACHMENT ON FLOOD PLAIN
LINE A - B IS THE FLOOD ELEVATION BEFORE ENCROACHMENT
LINE C - D IS THE FLOOD ELEVATION AFTER ENCROACHMENT
*SURCHARGE NOT TO EXCEED 1.0 FOOT (FEMA REQUIREMENT) OR LESSER AMOUNT IF SPECIFIED BY STATE.

FLOODWAY SCHEMATIC Figure 2

Near the mouths of streams studied in detail, floodway computations are made without regard to flood elevations on the receiving water body. Therefore, "Without Floodway" elevations presented in Table 3 for certain downstream cross sections of Ash Creek and Walnut Creek 1 are lower than the regulatory flood elevations in that area, which must take into account the 100-year flooding due to backwater from other sources.

5.0 INSURANCE APPLICATION

To establish actuarial insurance rates, data from the engineering study must be transformed into flood insurance criteria. This process includes the determination of reaches, Flood Hazard Factors, and flood insurance zone designations for each flooding source studied in detail in the unincorporated areas of Tarrant County.

5.1 Reach Determinations

Reaches are defined as sections of flood plain that have relatively the same flood hazard, based on the average weighted difference in water-surface elevations between the 10- and 100-year floods. This difference

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may not have a variation greater than that indicated in the following tabulation for more than 20 percent of the reach:

Average Difference Between 10- and 100-Year Floods	Variation
Less than 2 feet	0.5 foot
2 to 7 feet	1.0 foot
7.1 to 12 feet	2.0 feet
More than 12 feet	3.0 feet

The locations of the reaches determined for the flooding sources of the unincorporated areas of Tarrant County are shown on the Flood Profiles (Exhibit 1) and summarized in Table 4.

5.2 Flood Hazard Factors

The Flood Hazard Factor (FHF) is used to establish relationships between depth and frequency of flooding in any reach. This relationship is then used with depth-damage relationships for various classes of structures to establish actuarial insurance rate tables.

The FHF for a reach is the average weighted difference between the 10- and 100-year flood water-surface elevations rounded to the nearest one-half foot, multiplied by 10, and shown as a three-digit code. For example, if the difference between water-surface elevations of the 10- and 100-year floods is 0.7 foot, the FHF is 005; if the difference is 1.4 feet, the FHF is 015; if the difference is 5.0 feet, the FHF is 050. When the difference between the 10- and 100-year flood water-surface elevations is greater than 10.0 feet, it is rounded to the nearest whole foot.

5.3 Flood Insurance Zones

Flood insurance zones and zone numbers are assigned based on the type of flood hazard and the FHF, respectively. A unique zone number is associated with each possible FHF, and varies from 1 for a FHF of 005 to a maximum of 30 for a FHF of 200 or greater.

Zone A:	Special Flood Hazard Areas inundated by the 100-year flood, determined by approximate methods; no base flood elevations shown or FHFs determined.
Zones A1, A2, A3, A4, A5, A6, A7, A8, A9, A10, A11, A14, and A20:	Special Flood Hazard Areas inundated by the 100-year flood; with base flood elevations shown, and zones subdivided according to FHFs.

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FMF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Ash Creek							
Reach 1	75	-2.4	-0.7	+1.5	025	A5	Varies
Bear Creek 1							
Reach 1	60	-2.9	-0.9	+1.6	030	A6	Varies
Reach 2	50,55	-0.8	-0.3	+0.5	010	A2	Varies
Benbrook Lake							
Reach 1	215,220, 250,255	-10.2	-2.8	+12.0	100	A20	715
Big Fossil Creek							
Reach 1	50	-0.8	-0.2	+0.4	010	A2	Varies
Boaz Creek							
Reach 1	180,220	-1.4	-0.4	+0.7	015	A3	Varies
Briar Creek							
Reach 1	05	-1.3	-0.4	+0.7	015	A3	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

ASH CREEK — BEAR CREEK 1 — BENBROOK LAKE — BIG FOSSIL CREEK — BOAZ CREEK — BRIAR CREEK

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Buffalo Creek							
Reach 1	15	-0.8	-0.2	+0.4	010	A2	Varies
Chambers Creek							
Reach 1	230	-1.2	-0.3	+0.8	010	A2	Varies
Deer Creek							
Reach 1	265	-1.7	-0.5	+0.9	015	A3	Varies
Eagle Mountain Lake							
Reach 1	05,40, 45,75, 80	-4.4	-1.5	+8.0	045	A9	657
Elm Branch							
Reach 1	230	-0.9	-0.2	+0.6	010	A2	Varies
Reach 2	230, 265	-2.3	-0.5	+1.1	025	A5	Varies
Reach 3	265	-0.8	-0.3	+0.5	010	A2	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

BUFFALO CREEK — CHAMBERS CREEK — DEER CREEK — EAGLE MOUNTAIN LAKE — ELM BRANCH

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Grapevine Lake							
Reach 1	25,30	-10.0	-1.7	+4.4	100	A20	564
Henrietta Creek							
Reach 1	15	-1.8	-0.5	+1.0	020	A3	Varies
Reach 2	15	-1.9	-0.5	+1.1	020	A4	Varies
Reach 3	15	-0.9	-0.3	+0.5	010	A2	Varies
Joe Pool Lake							
Reach 1	275	-9.9	-1.5	+6.0	100	A20	538
Low Branch							
Reach 1	275	-1.2	-0.4	+0.8	010	A2	Varies
Marine Creek Lake							
Reach 1	80	-6.8	-3.4	+3.9	070	A14	698

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

GRAPEVINE LAKE · HENRIETTA CREEK · JOE POOL LAKE · LOW BRANCH · MARINE CREEK LAKE

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Marys Creek							
Reach 1	180	-5.1	-1.8	+2.3	050	A10	Varies
Reach 2	180	-2.3	-0.7	+1.2	025	A5	Varies
Reach 3	180	-3.4	-1.1	+2.8	035	A7	Varies
North Branch of Deer Creek							
Reach 1	260	-1.2	-0.3	+0.8	010	A2	Varies
North Creek							
Reach 1	295	-1.1	-0.3	+0.4	010	A2	Varies
Paschal Branch							
Reach 1	75	-0.9	-0.3	+0.5	010	A2	Varies
Reach 2	75	-1.9	-0.5	+1.1	020	A4	Varies
South Fork of Deer Creek							
Reach 1	295	-0.7	-0.2	+0.C	005	A1	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

MARYS CREEK - NORTH BRANCH OF DEER CREEK - NORTH CREEK - PASCHAL BRANCH - SOUTH FORK OF DEER CREEK

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100 YEAR) FLOOD AND			FHP	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
South Fork of North Branch of Deer Creek Reach 1	260	-1.3	-0.3	+0.8	015	A3	Varies
South Marys Creek Reach 1	180	-2.0	-0.5	+1.0	020	A4	Varies
Stream BFC-2A Reach 1	50,85	-0.7	-0.2	+0.4	005	A1	Varies
Stream BFC-4 Reach 1	50	-1.0	-0.3	+0.6	010	A2	Varies
Stream CF-5 Reach 1	220	-1.5	-0.4	+0.9	015	A3	Varies
Stream HEN-1 Reach 1	15	-0.6	-0.2	+0.3	005	A1	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

SOUTH FORK OF NORTH BRANCH OF DEER CREEK · SOUTH MARYS CREEK — STREAM BFC-2A · STREAM BFC-4 · STREAM CF-5 · STREAM HEN-1

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Stream HEN-2							
Reach 1	15	-5.1	-1.1	+1.6	050	A10	Varies
Reach 2	15	-4.5	-1.1	+1.5	045	A9	Varies
Reach 3	15	-2.2	-0.8	+1.4	020	A4	Varies
Reach 4	15	-1.2	-0.4	+0.9	010	A2	Varies
Stream HEN-2A							
Reach 1	15	-0.7	-0.2	+0.4	005	A1	Varies
Stream MSC-3							
Reach 1	180	-0.6	-0.2	+0.4	005	A1	Varies
Stream SC-7							
Reach 1	260	-1.0	-0.3	+0.8	010	A2	Varies
Stream VC-3							
Reach 1	230	-1.5	-0.4	+0.8	015	A3	Varies
Stream VC-4							
Reach 1	230	-2.1	-0.6	+1.1	020	A4	Varies
Reach 2	230	-1.1	-0.3	+0.7	010	A2	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

STREAM HEN-2 · STREAM HEN-2A · STREAM MSC-3 ·
STREAM SC-7 · STREAM VC-3 · STREAM VC-4

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Stream VC-5							
Reach 1	230, 265	-1.1	-0.3	+0.6	010	A2	Varies
Stream VC-6							
Reach 1	265	-0.7	-0.2	+0.4	005	A1	Varies
Stream VC-7							
Reach 1	265	-1.1	-0.5	+0.6	010	A2	Varies
Reach 2	265	-0.6	-0.2	+0.4	005	A1	Varies
Stream WB-1							
Reach 1	55,50	-0.7	-0.2	+0.5	005	A1	Varies
Sycamore Creek							
Reach 1	260	-1.0	-0.3	+1.0	010	A2	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

STREAM VC-5 — STREAM VC-6
STREAM VC-7 — STREAM WB-1 — SYCAMORE CREEK

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Village Creek							
Reach 1	230	-4.5	-1.4	+2.1	045	A9	Varies
Reach 2	230,265, 295,300	-2.6	-0.8	+1.5	025	A5	Varies
Walnut Creek 1							
Reach 1	40	-2.7	-0.8	+1.6	025	A5	Varies
Walnut Creek 2							
Reach 1	180,215, 220	-2.2	-0.6	+1.3	020	A4	Varies
Walnut Creek 3							
Reach 1	270,305, 275	-3.1	-0.9	+1.6	030	A6	Varies
West Fork of Trinity River							
Reach 1	135	-5.4	-1.8	+4.5	055	A11	Varies
Reach 2	75,80	-4.1	-1.4	+3.2	040	A8	Varies

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

VILLAGE CREEK — WALNUT CREEK 1
WALNUT CREEK 2 — WALNUT CREEK 3 — WEST FORK OF TRINITY RIVER

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FLOODING SOURCE	PANEL[1]	ELEVATION DIFFERENCE[2] BETWEEN 1.0% (100-YEAR) FLOOD AND			FHF	ZONE	BASE FLOOD ELEVATION[3] (NGVD)
		10% (10 YR.)	2% (50 YR.)	0.2% (500 YR.)			
Willow Branch Reach 1	270	-1.3	-0.4	+0.7	015	A3	Varies
Whites Branch Reach 1	90	-1.4	-0.4	+0.8	015	A3	Varies
Lake Worth Reach 1	80, 115	-3.4	-1.1	+2.8	035	A7	600

[1]Flood Insurance Rate Map Panel
[2]Weighted Average
[3]Rounded to the nearest foot - see map

TABLE 4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

FLOOD INSURANCE ZONE DATA

WILLOW BRANCH — WHITES BRANCH — LAKE WORTH

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Zone B: Areas between the Special Flood Hazard Areas and the limits of the 500-year flood; areas that are protected from the 100- or 500-year floods by dike, levee, or other water control structure; areas subject to certain types of 100-year shallow flooding where depths are less than 1.0 foot; and areas subject to 100-year flooding from sources with drainage areas less than 1 square mile. Zone B is not subdivided.

Zone C: Areas of minimal flooding; not subdivided.

Flood elevation differences, FHFs, flood insurance zones, and base flood elevations for the flooding sources studied in detail in the community are shown in Table 4.

5.4 Flood Insurance Rate Map Description

The Flood Insurance Rate Map for the unincorporated areas of Tarrant County is, for insurance purposes, the principal result of the Flood Insurance Study. This map contains the official delineation of flood insurance zones and base flood elevations. Base flood elevation lines show the locations of the expected whole-foot water-surface elevation of the base (100-year) flood. The base flood elevations and zone numbers are used by insurance agents, in conjunction with structure elevations and characteristics, to assign actuarial insurance rates to structures and contents insured under the National Flood Insurance Program.

6.0 OTHER STUDIES

Flood Insurance Studies are currently being prepared for the Cities of Arlington, Burleson, and Fort Worth; and the unincorporated areas of Ellis County (References 21, 12, 13, and 33). The results of those studies will be in exact agreement with the results of this study.

Flood Insurance Studies for the following have been completed: Cities of Bedford, Mansfield, White Settlement, Crowley, Haslet, Azle, South Lake, North Richland Hills, Grapevine, Watauga, Blue Mound, Euless, Everman, Forest Hill, Grand Prairie, Haltom, Hurst, Kennedale, Richland Hills, River Oaks, and Saginaw; the Village of Edgecliff; the Towns of Westworth Village, Colleyville, Dalworthington Gardens, Pantego, and Westover Hills; and the unincorporated areas of Denton, Dallas, Johnson, Parker, and Wise Counties (References 34, 4, 23, 11, 14, 15, 16, 22, 24, 25, 35, 32, 36, 31, 37, 38, 39, 30, 40, 41, 42, 43, 27, 28, 44, 45, 46, 47, 48, 49, 50, and 51). The results of this study are in exact agreement with the results of those studies.

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Flood Insurance Studies for the Cities of Benbrook and Keller have been completed but do not match the Tarrant County study (References 5 and 26). One conflict is on Marys Creek at the county boundary of Benbrook and Tarrant County. This study defines the changes that have occurred on Marys Creek in Benbrook and in the county. The other conflict is on Bear Creek at the county boundary of Keller and Tarrant County. This study models upstream of Keller and this changes the hydrology at the county boundary of Keller. These results should be incorporated into the older Flood Insurance Studies of Benbrook and Keller.

Due to the more detailed analyses, this Flood Insurance Study supersedes the previous Flood Hazard Boundary Map for Tarrant County (Reference 29).

7.0 LOCATION OF DATA

Information concerning the pertinent data used in preparation of this study can be obtained by contacting FEMA, the Natural and Technological Hazards Division, Federal Regional Center, 800 North Loop 188, Denton, Texas, 76201.

8.0 BIBLIOGRAPHY AND REFERENCES

1. U. S. Department of Commerce, Bureau of the Census, 1980 Census of Population, Number of Inhabitants, Texas, Washington, D. C., Government Printing Office, 1981.

2. A. M. Belo Corporation, Texas Almanac, 1982-1983, Dallas, Texas, 1981.

3. U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Environmental Data Service, Monthly and Annual Climatological Data for Texas State, Asheville, North Carolina, National Climatic Center, published annually.

4. Federal Emergency Management Agency, Flood Insurance Study, City of Mansfield, Johnson and Tarrant Counties, Texas, Washington, D. C., December 18, 1985.

5. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Benbrook, Tarrant County, Texas, Washington, D. C., July 2, 1979.

6. U. S. Army Corps of Engineers, Fort Worth District, Computer Program NUDALLAS, Fort Worth, Texas, revised September 1982.

7. U. S. Department of Commerce, Weather Bureau, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, Washington, D. C., 1961, Revised 1963.

BEST COPY AVAILABLE

8. U. S. Department of Commerce, National Oceanic and Atmospheric Administration, Technical Memorandum NWS Hydro-35, 5-to 60-Minute Precipitation Frequency for the Eastern and Central United States, Asheville, North Carolina, National Climatic Center, June 1977.

9. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Davis, California, January 1981, with updates.

10. U. S. Army Corps of Engineers, Little Rock District, modified by the Fort Worth District, LRD-1, modified, Water Surface Profiles by William A. Thomas, Little Rock, Arkansas, 1974.

11. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Crowley, Tarrant County, Texas, Washington, D. C., April 15, 1981.

12. Federal Emergency Management Agency, Flood Insurance Study, City of Burleson, Johnson and Tarrant Counties, Texas (Unpublished).

13. Federal Emergency Management Agency, Flood Insurance Study, City of Fort Worth, Tarrant County, Texas (Unpublished).

14. Federal Emergency Management Agency, Flood Insurance Study, City of Haslet, Tarrant County, Texas, Washington, D. C., October 15, 1985.

15. Federal Emergency Management Agency, Flood Insurance Study, City of Azle, Parker and Tarrant Counties, Texas (Unpublished).

16. Federal Emergency Management Agency, Flood Insurance Study, City of South Lake, Tarrant County, Texas, Washington, D. C., July 5, 1982.

17. U. S. Army Corps of Engineers, Fort Worth District, Lakeview Reservoir, Joe Pool Lake, Design Memorandum No. 1, Hydrology, Supplement No. 2, Fort Worth, Texas, 1974.

18. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Davis, California, February 1972.

19. U. S. Army Corps of Engineers, Hydrologic Engineering Center, HEC-2 Water Surface Profiles, Davis California, December 1968, with updates.

BEST COPY AVAILABLE

20. U. S. Department of the Interior, Geological Survey, 7.5 Minute Series Topographic Maps, Scale 1:24,000, Contour Interval 10 Feet: Aledo, Texas, 1955, Photorevised 1968; Avondale, Texas, 1955, Photorevised 1972; Azle, Texas, 1972, Photorevised 1978; Benbrook, Texas, 1955, Photorevised 1972; Burleson, Texas, 1955, Photorevised 1973; Euless, Texas, 1957, Photorevised 1973; Fort Worth, Texas, 1955, Photorevised 1972; Keller, Texas, 1955, Photorevised 1973; Kennedale, Texas, 1959, Photorevised 1973; Mansfield, Texas, 1959, Photorevised 1973, and Primrose, Texas, 1968, Photorevised 1978.

21. Federal Emergency Management Agency, Flood Insurance Study, City of Arlington, Tarrant County, Texas (Unpublished).

22. Federal Emergency Management Agency, Flood Insurance Study, City of North Richland Hills, Tarrant County, Texas, Washington, D. C., November 15, 1985.

23. Federal Emergency Management Agency, Flood Insurance Study, City of White Settlement, Tarrant County, Texas, Washington, D. C., July 17, 1986.

24. Federal Emergency Management Agency, Flood Insurance Study, City of Grapevine, Tarrant County, Texas, Washington, D. C., November 17, 1982.

25. Federal Emergency Management Agency, Flood Insurance Study, City of Watauga, Tarrant County, Texas, Washington, D. C., June 1, 1982.

26. Federal Emergency Management Agency, Flood Insurance Study, City of Keller, Tarrant County, Texas, Washington, D. C., September 30, 1982.

27. Federal Emergency Management Agency, Flood Insurance Study, Town of Westworth Village, Tarrant County, Texas, Washington, D. C., June 3, 1986.

28. Federal Emergency Management Agency, Flood Insurance Study, Town of Colleyville, Tarrant County, Texas, Washington, D. C., December 1, 1982.

29. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Hazard Boundary Map, Tarrant County, Texas, Washington, D. C., July 5, 1977.

30. Federal Emergency Management Agency, Flood Insurance Study, City of Kennedale, Tarrant County, Texas, Washington, D. C., November 15, 1984.

31. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Forest Hill, Tarrant County, Texas, Washington, D. C., August 1, 1978.

32. Federal Emergency Management Agency, Flood Insurance Study, City of Euless, Tarrant County, Texas, Washington, D. C., April 3, 1985.

BEST COPY AVAILABLE

33. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Ellis County, Texas (Unpublished).

34. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Bedford, Tarrant County, Texas, Washington D. C., March 18, 1987.

35. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Blue Mound, Tarrant County, Texas, Washington D. C., July 16, 1980.

36. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Everman, Tarrant County, Texas, Washington, D. C., September 17, 1980.

37. Federal Emergency Management Agency, Flood Insurance Study, City of Grand Prairie, Tarrant County, Texas, Washington, D. C., February 1, 1985.

38. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, City of Haltom, Tarrant County, Texas, Washington, D. C., February 1, 1978.

39. Federal Emergency Management Agency, Flood Insurance Study, City of Hurst, Tarrant County, Texas, Washington, D. C., October 15, 1985.

40. Federal Emergency Management Agency, Flood Insurance Study, City of Richland Hills, Tarrant County, Texas, Washington, D. C., July 3, 1985.

41. Federal Emergency Management Agency, Flood Insurance Study, City of River Oaks, Tarrant County, Texas, Washington, D. C., June 19, 1985.

42. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, City of Saginaw, Tarrant County, Texas, Washington, D. C., September 17, 1980.

43. U. S. Department of Housing and Urban Development, Federal Insurance Administration, Flood Insurance Study, Village of Edgecliff, Tarrant County, Texas, Washington, D. C., August 19, 1986.

44. Federal Emergency Management Agency, Flood Insurance Study, Town of Dalworthington Gardens, Tarrant County, Texas, Washington, D. C., May 17, 1982.

45. Federal Emergency Management Agency, Federal Insurance Administration, Flood Insurance Study, Town of Pantego, Tarrant County, Texas, Washington, D. C., July 16, 1980.

BEST COPY AVAILABLE

46. Federal Emergency Management Agency, Flood Insurance Study, Town of Westover Hills, Tarrant County, Texas, Washington, D. C., June 5, 1985.

47. Federal Emergency Management Agency, Flood Insurance Study, Unincorporated Areas of Denton County, Texas, Washington, D. C., May 4, 1987.

48. Federal Emergency Management Agency, Flood Hazard Boundary Map, Unincorporated Areas of Dallas County, Texas, July 19, 1982.

49 Federal Emergency Management Agency, Flood Hazard Boundary Map, Unincorporated Areas of Johnson County, May, 71, 1977.

50. Federal Emergency Management Agency, Flood Hazard Boundary Map, Unincorporated Areas of Parker County, Texas, December 27, 1977.

51. Federal Emergency Management Agency, Flood Hazard Boundary Map, Unincorporated Areas of Wise County, Texas, June 7, 1977.

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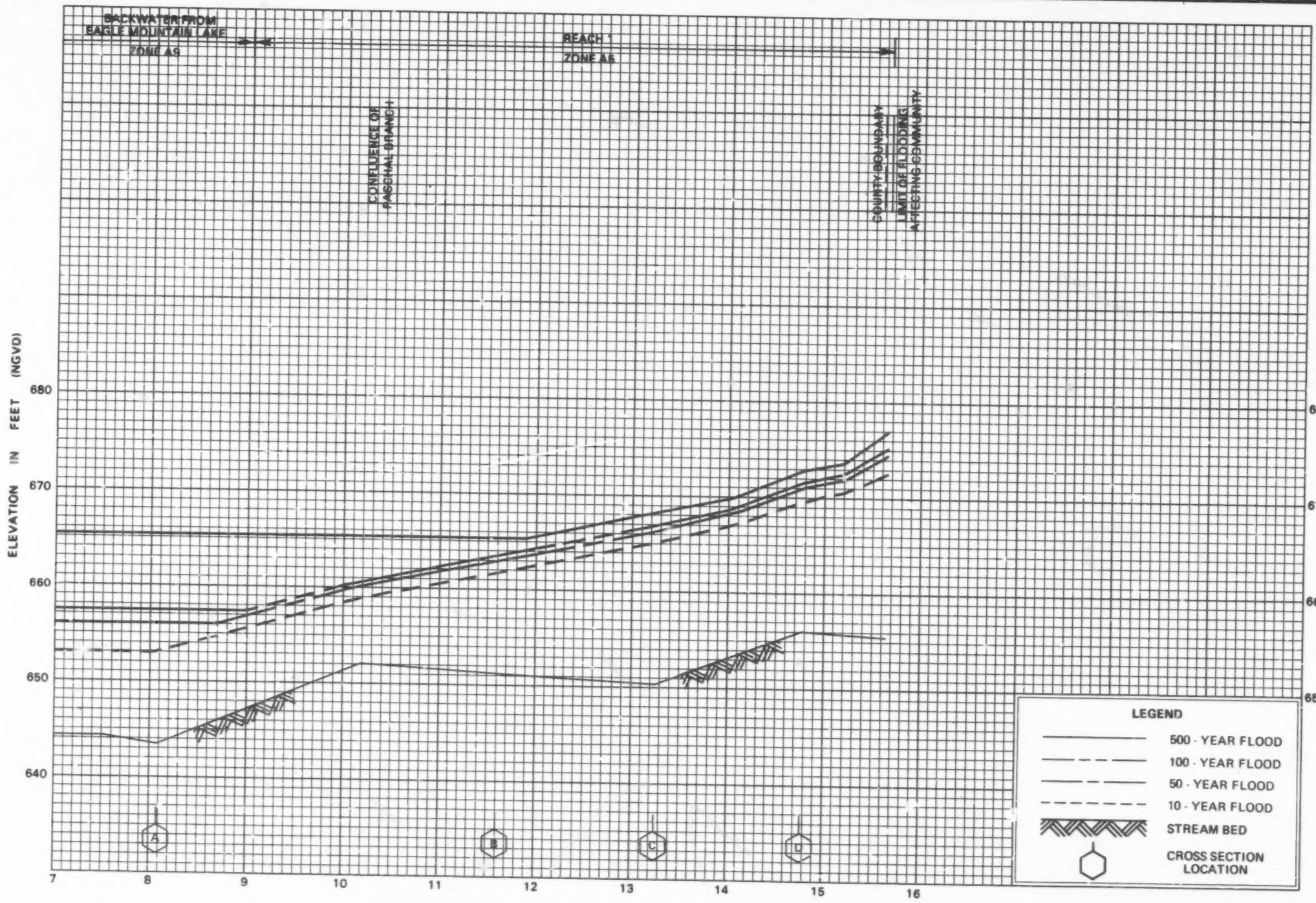

FLOOD PROFILES

ASH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

01P

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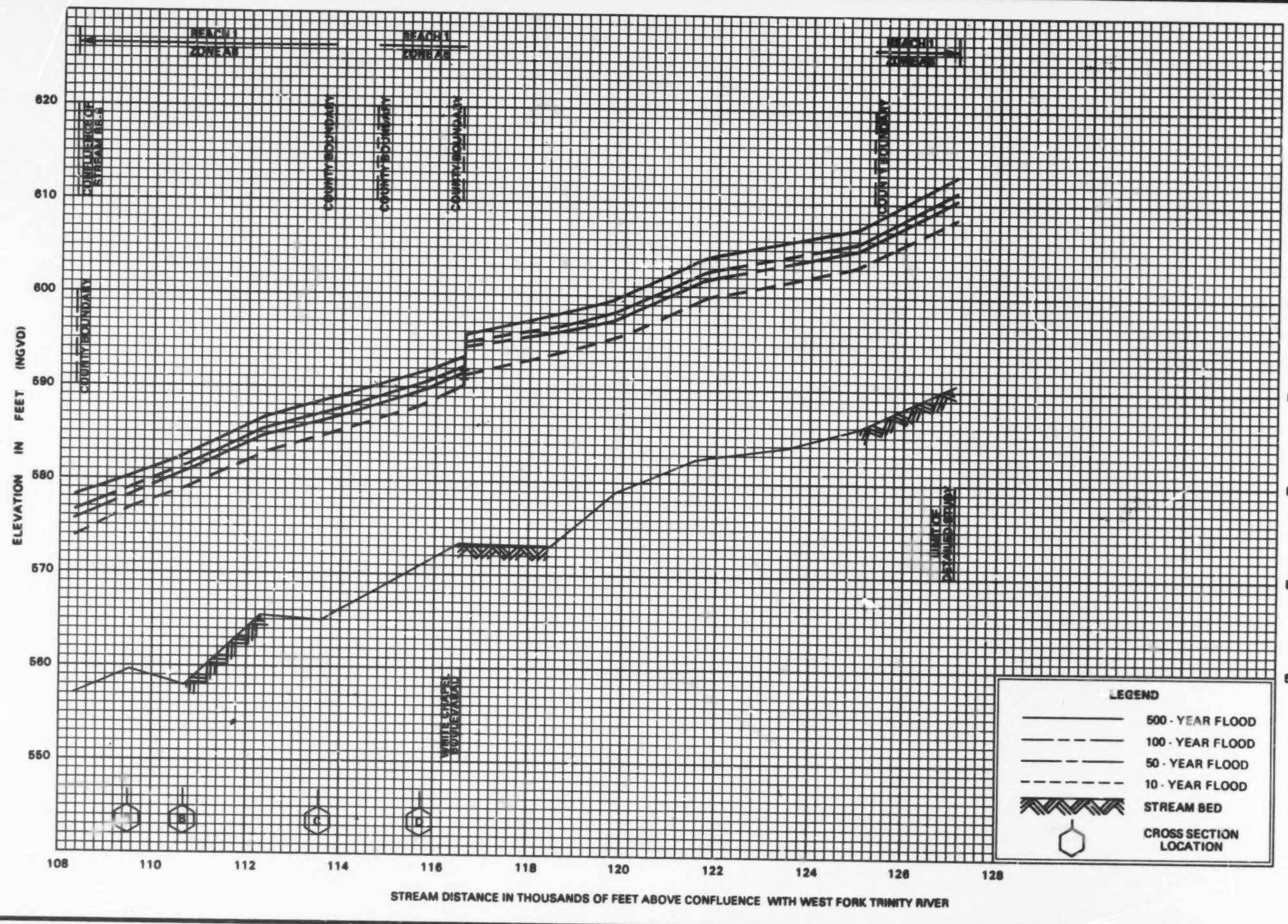

FLOOD PROFILES

BEAR CREEK 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

02P

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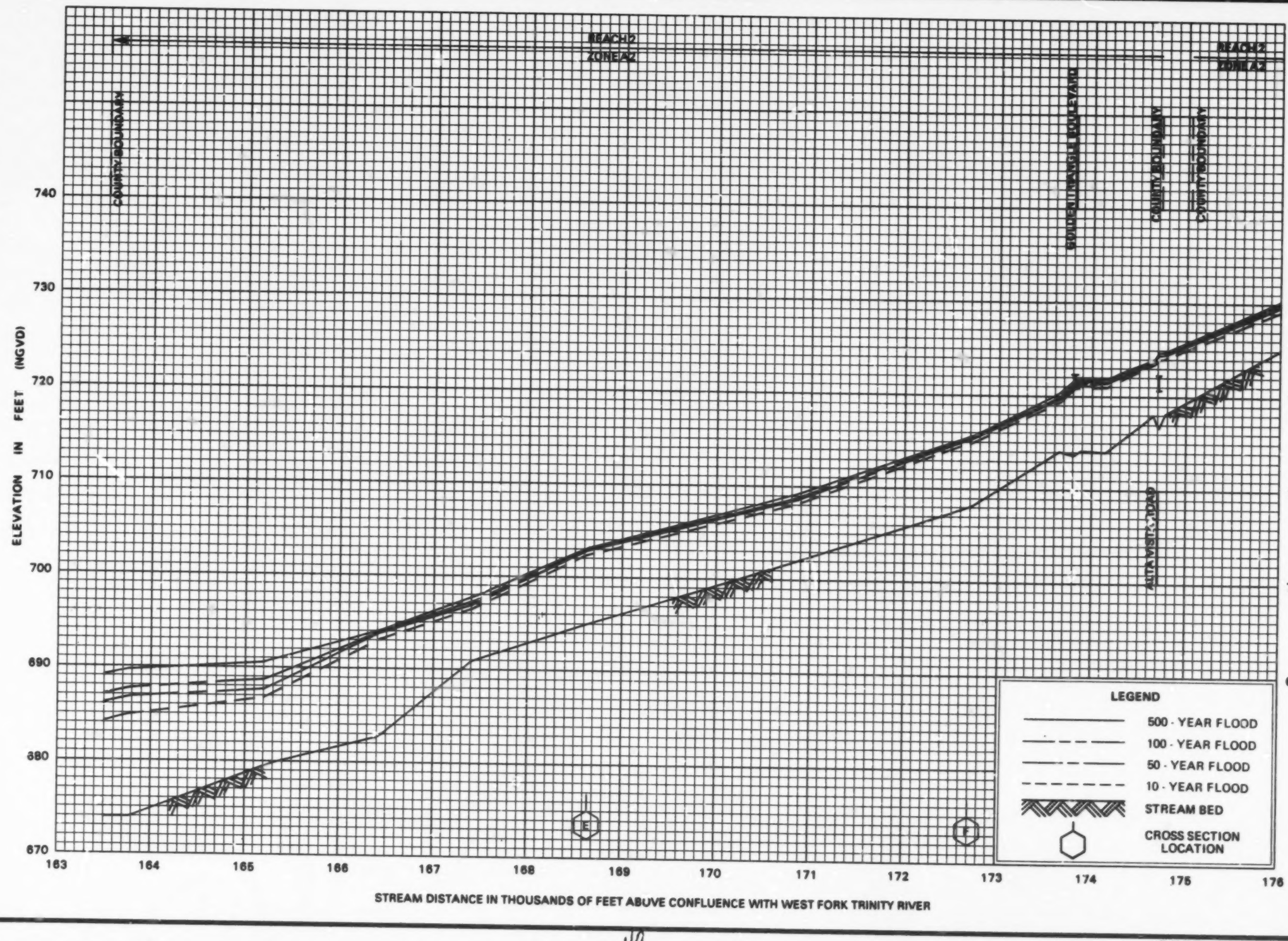

FLOOD PROFILES

BEAR CREEK 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

03P

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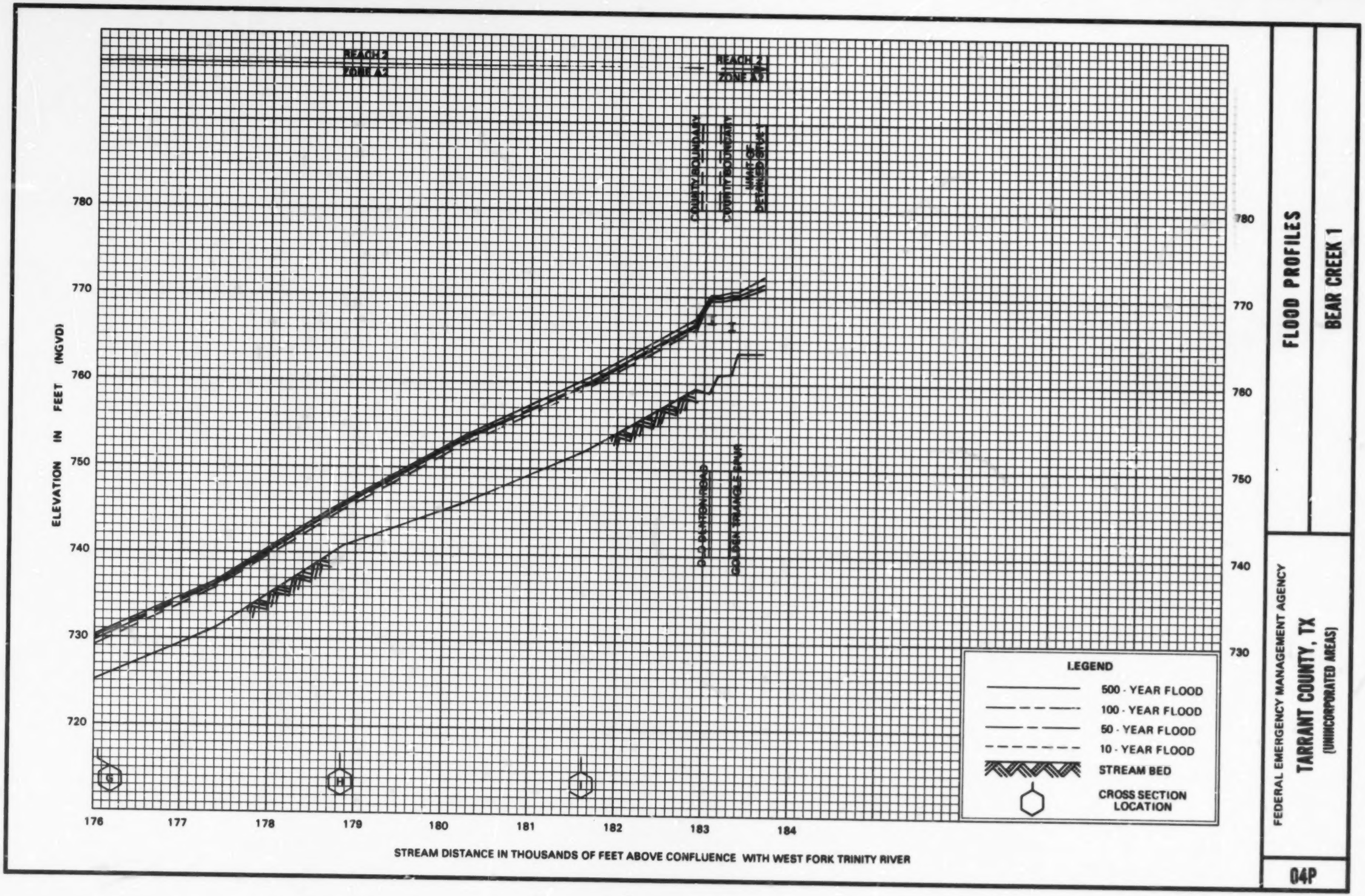

FLOOD PROFILES

BEAR CREEK 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

04P

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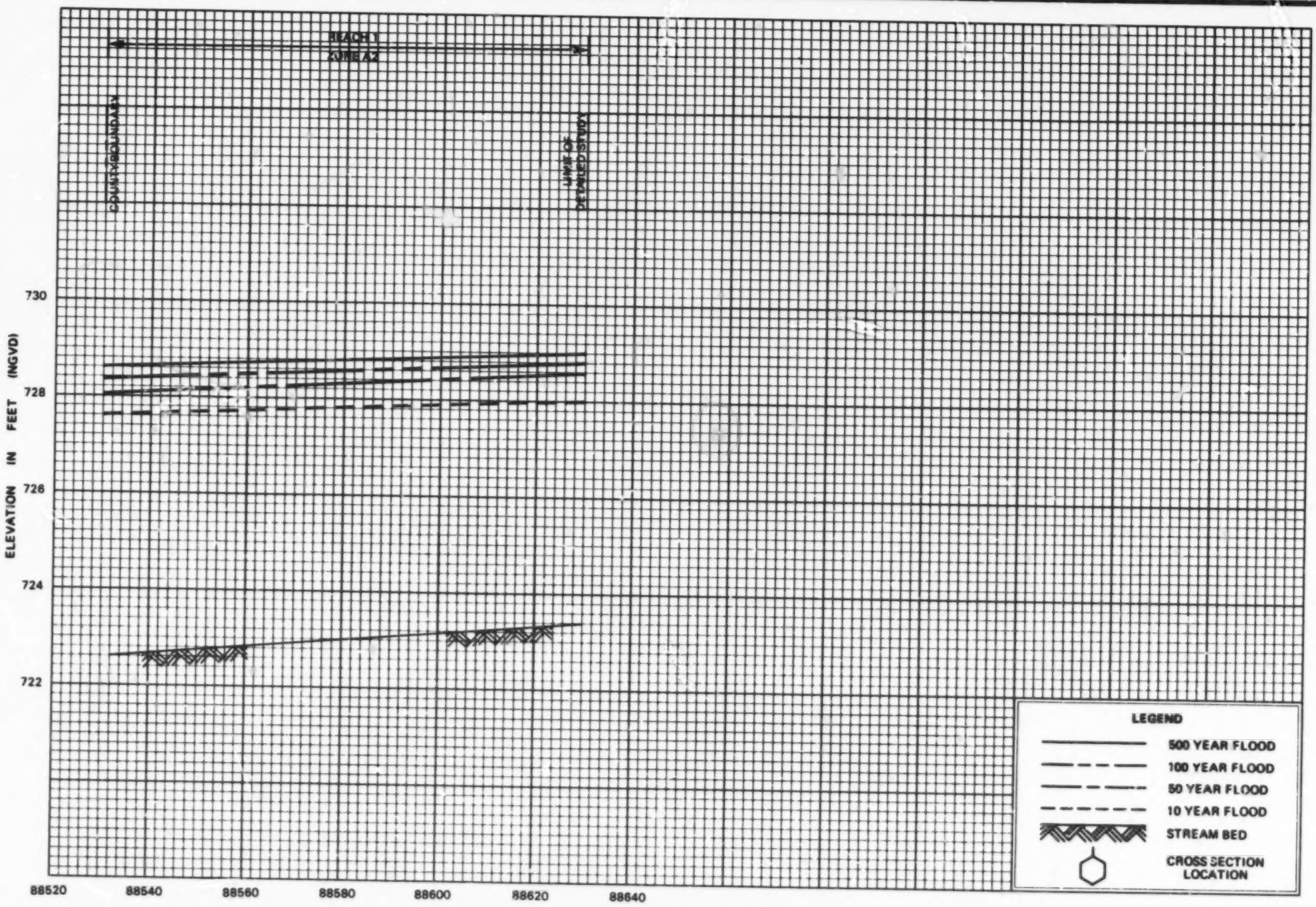

FLOOD PROFILES

BIG FOSSIL CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

05P

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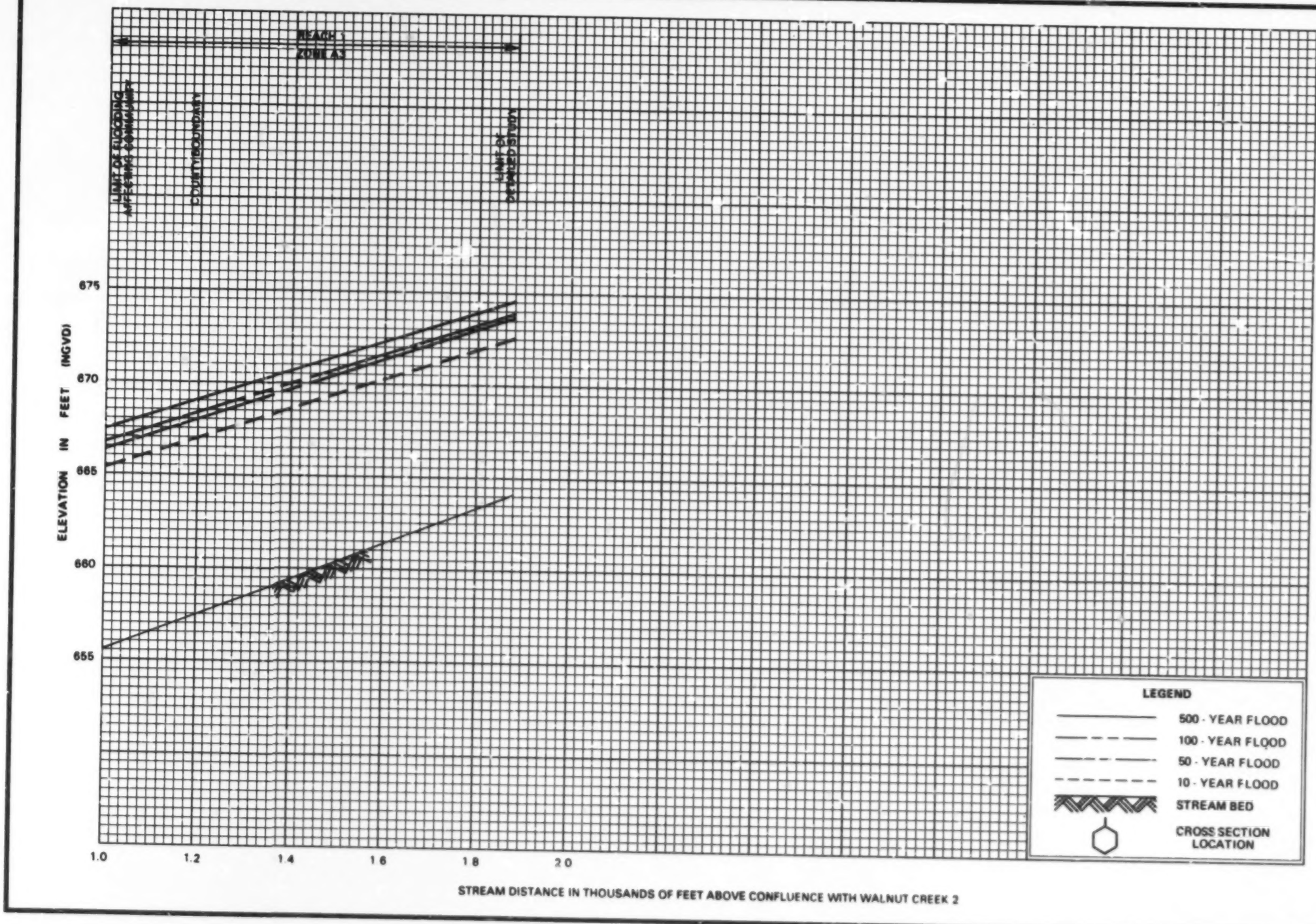

FLOOD PROFILES

BOAZ CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

06P

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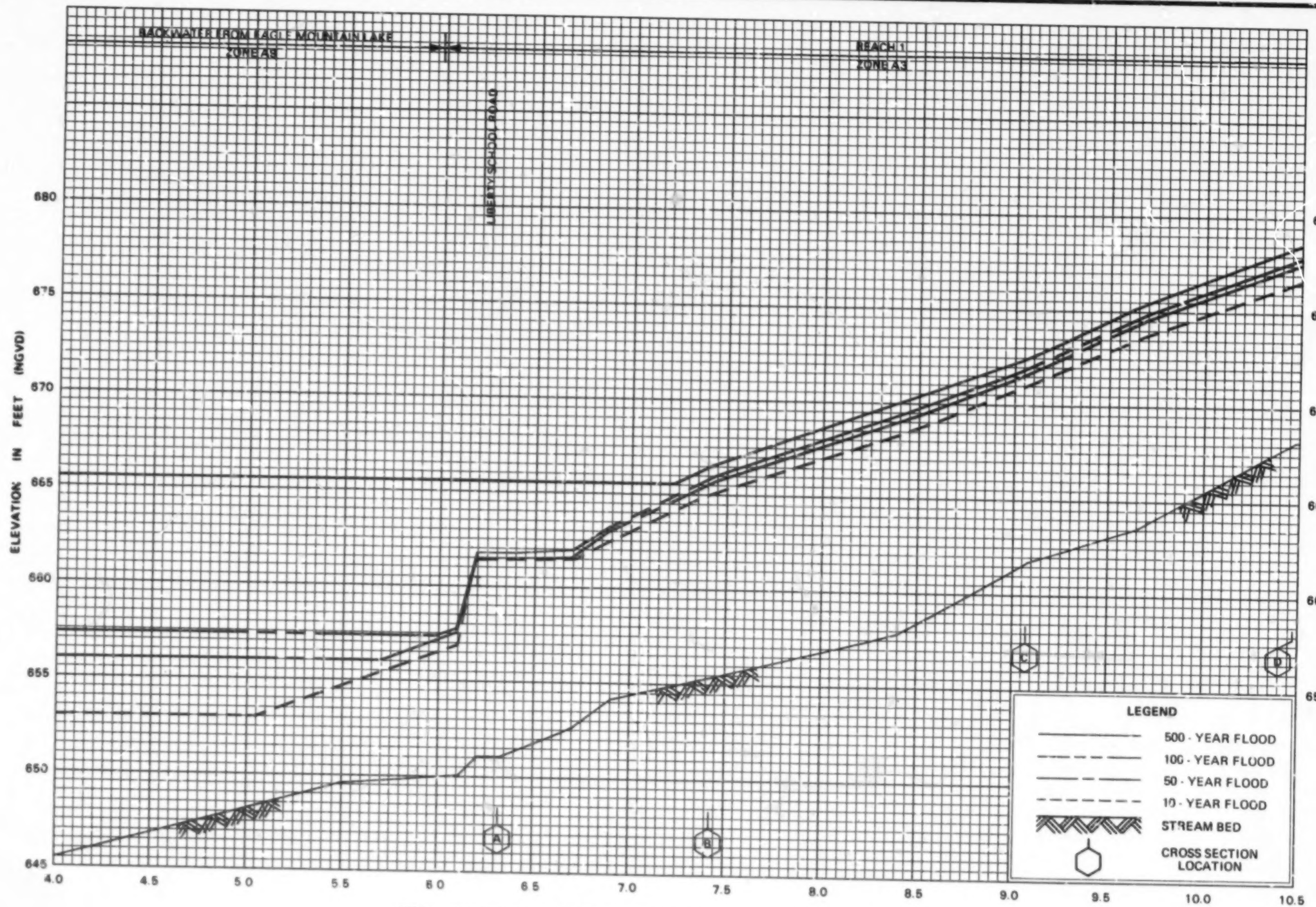

FLOOD PROFILES

BRIAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

07P

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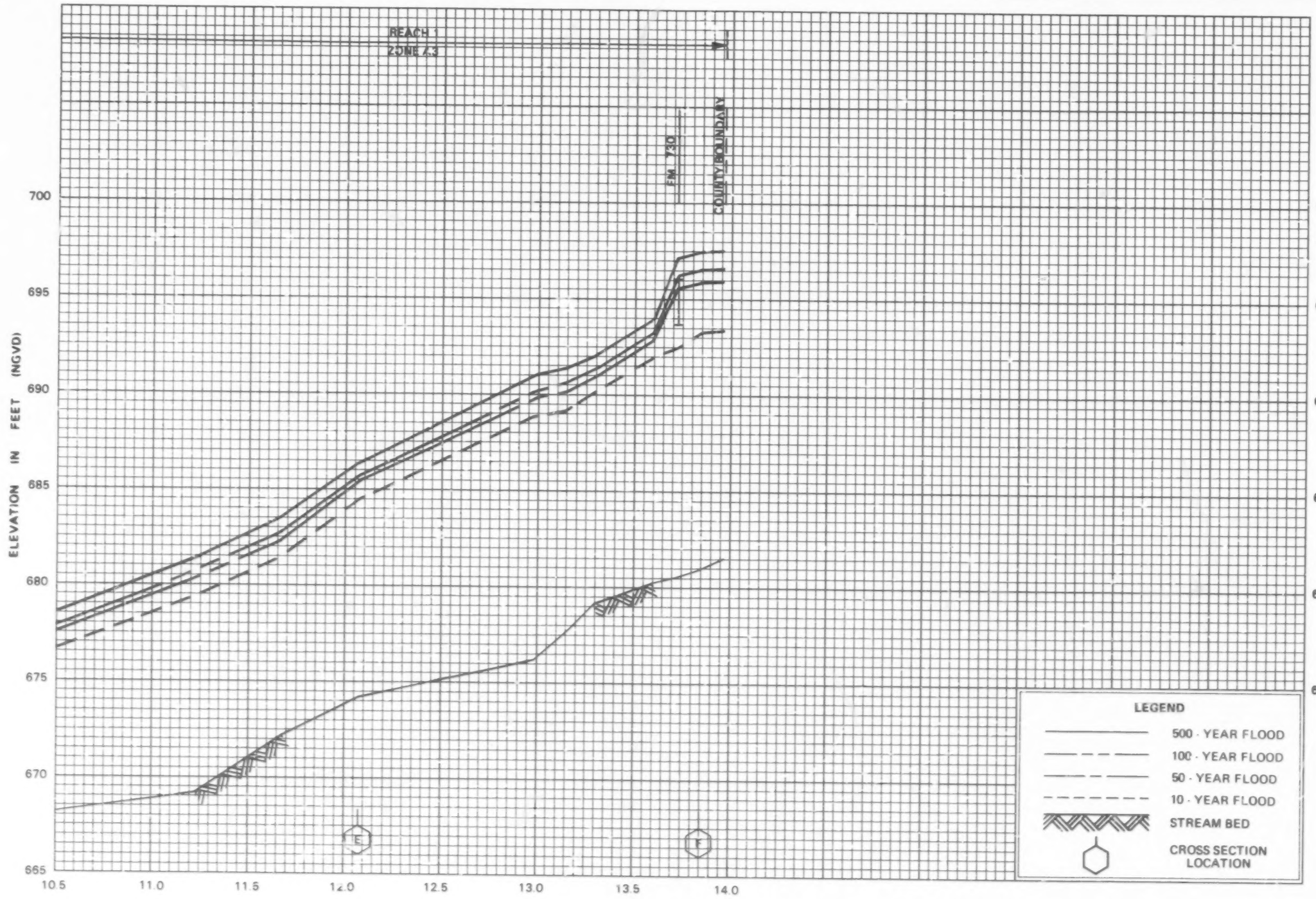

FLOOD PROFILES

BRIAR CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

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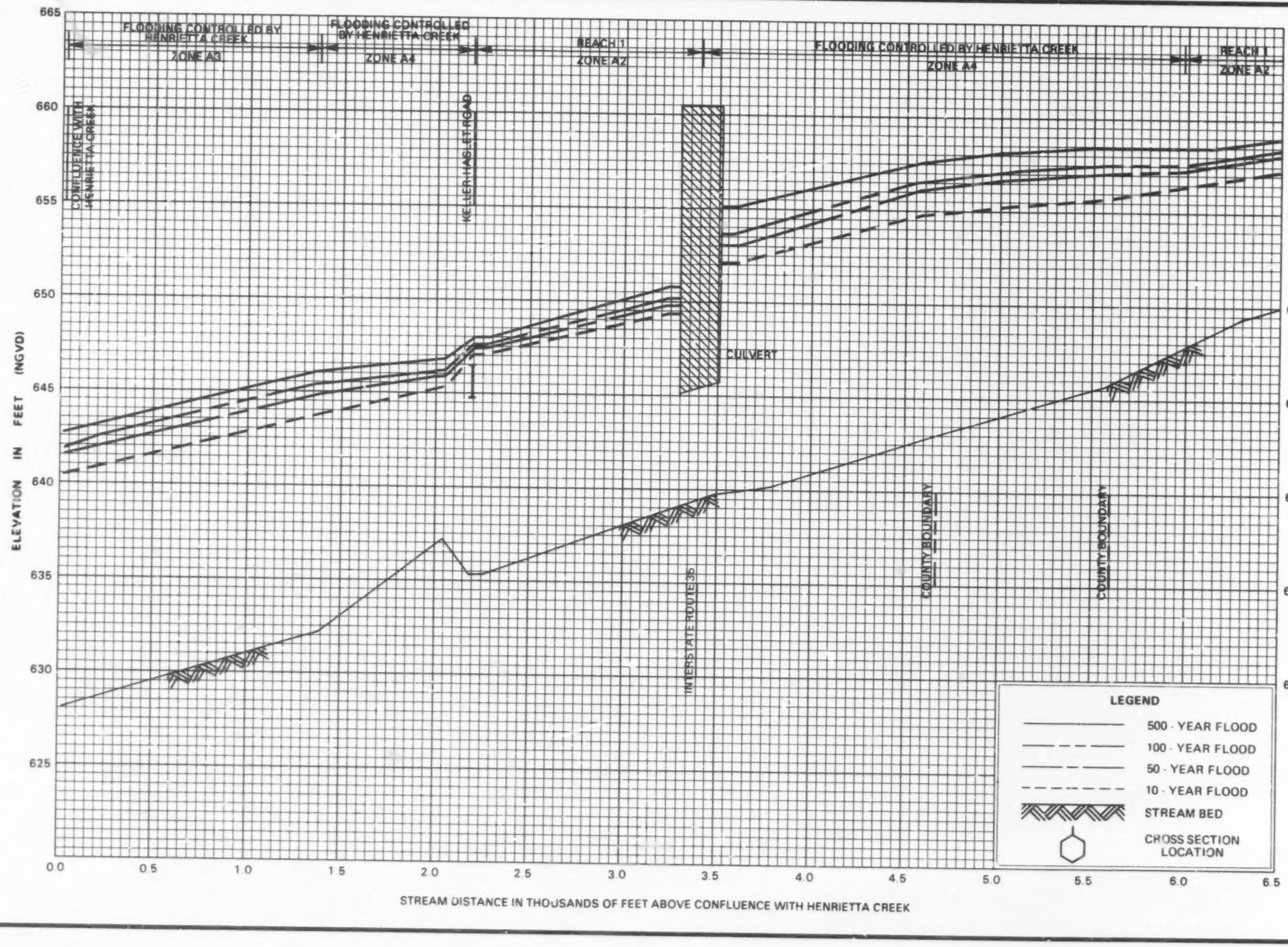

FLOOD PROFILES

BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

09P

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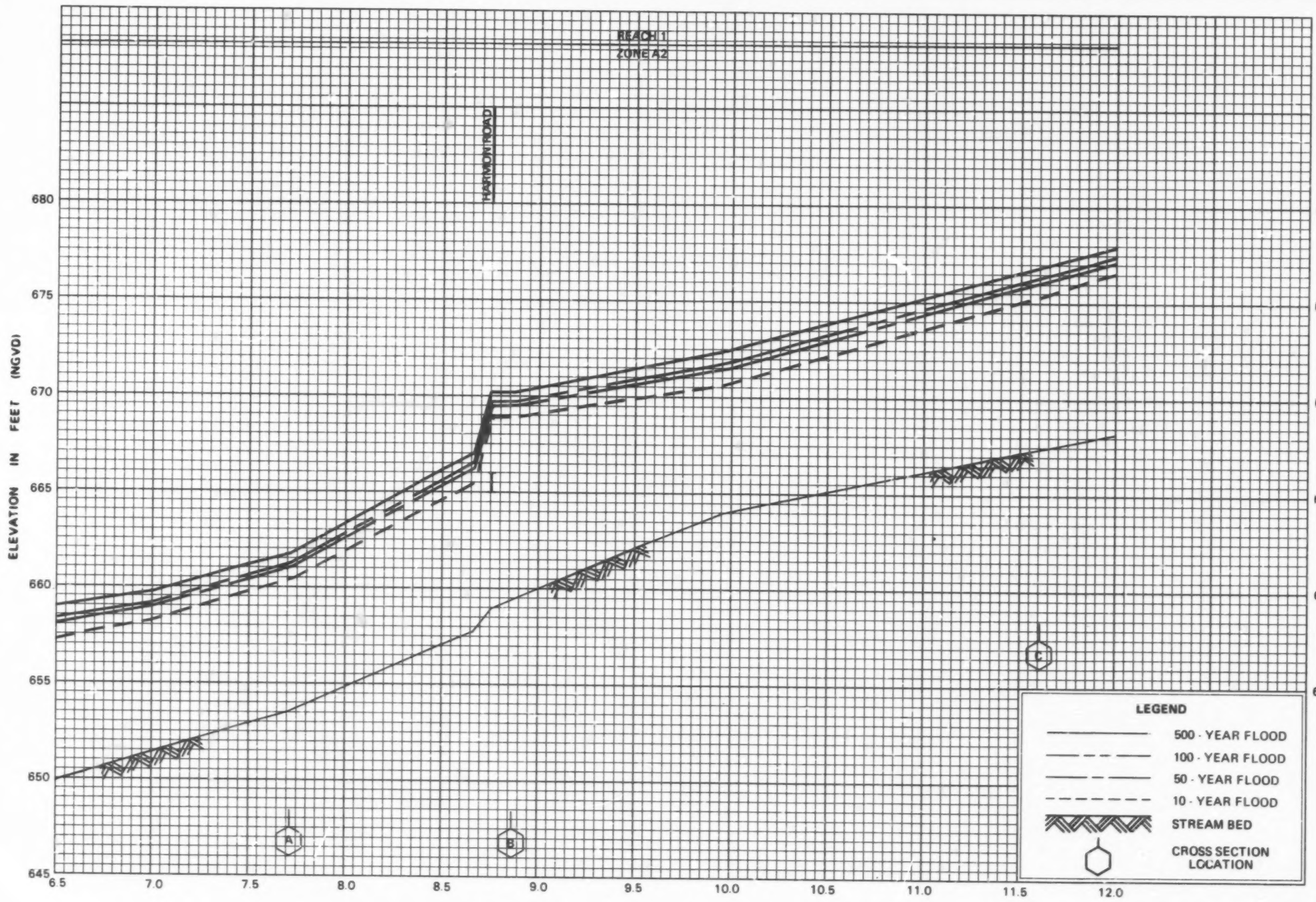

FLOOD PROFILES

BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

10P

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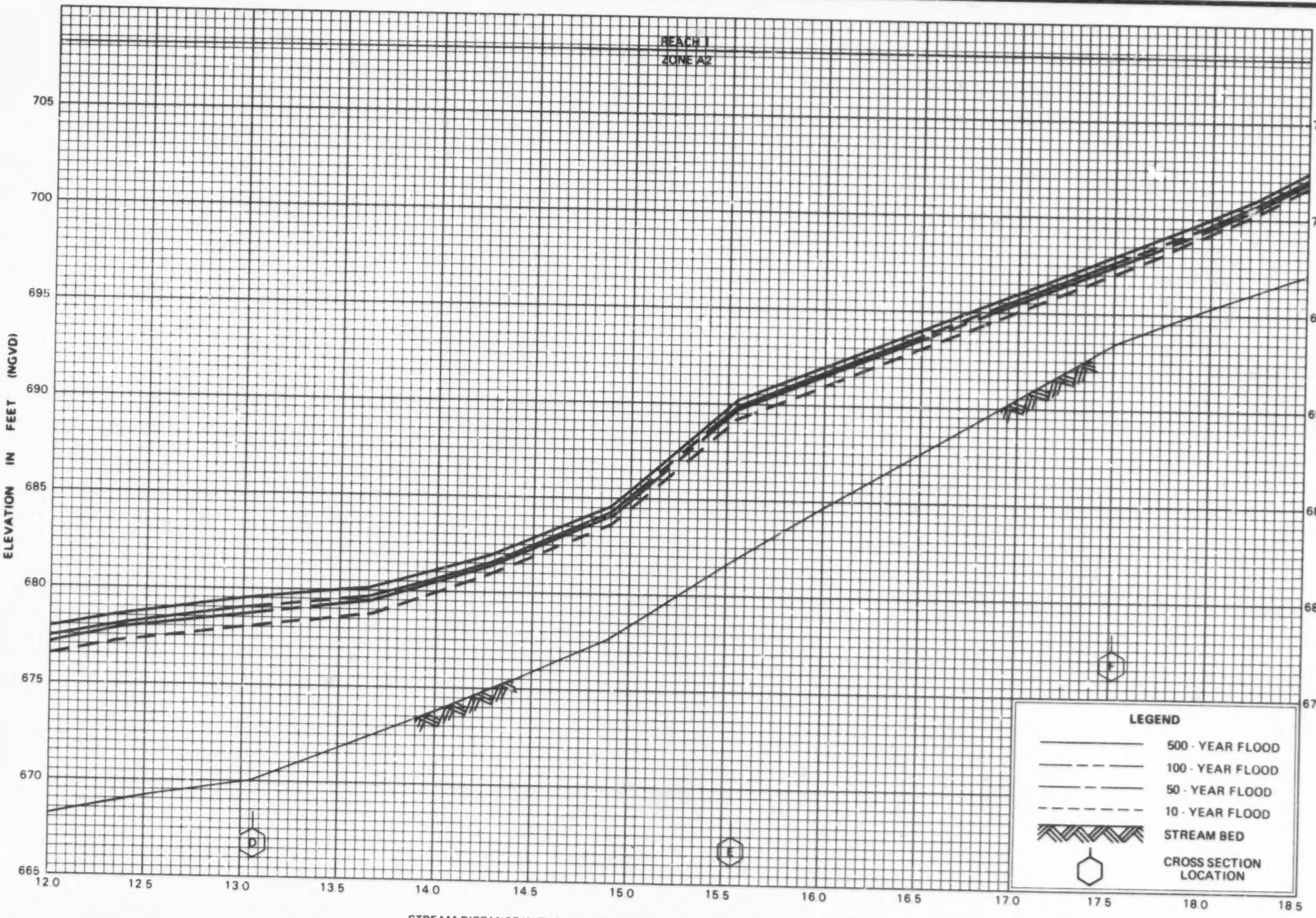

FLOOD PROFILES

BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

11P

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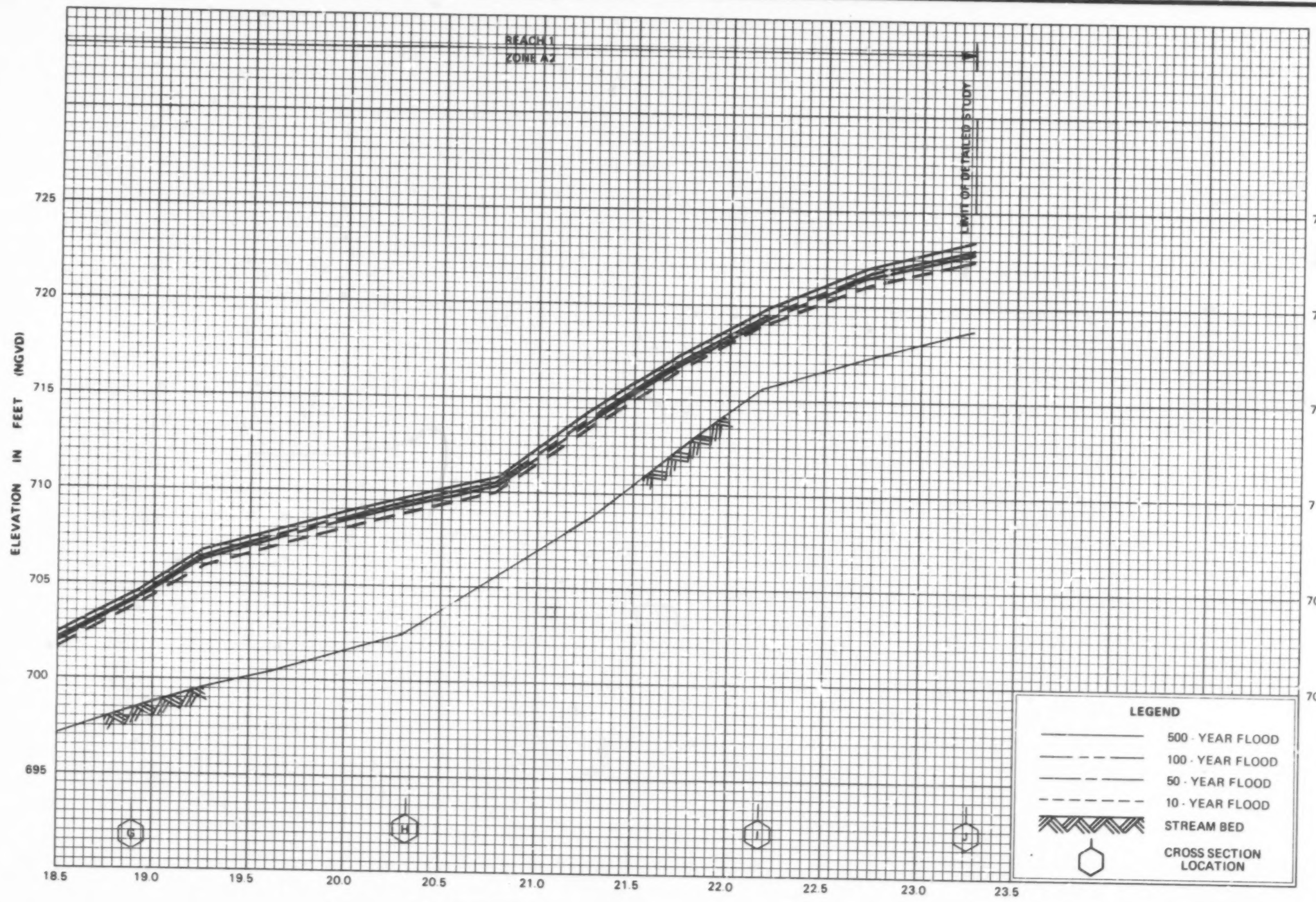

FLOOD PROFILES

BUFFALO CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

12P

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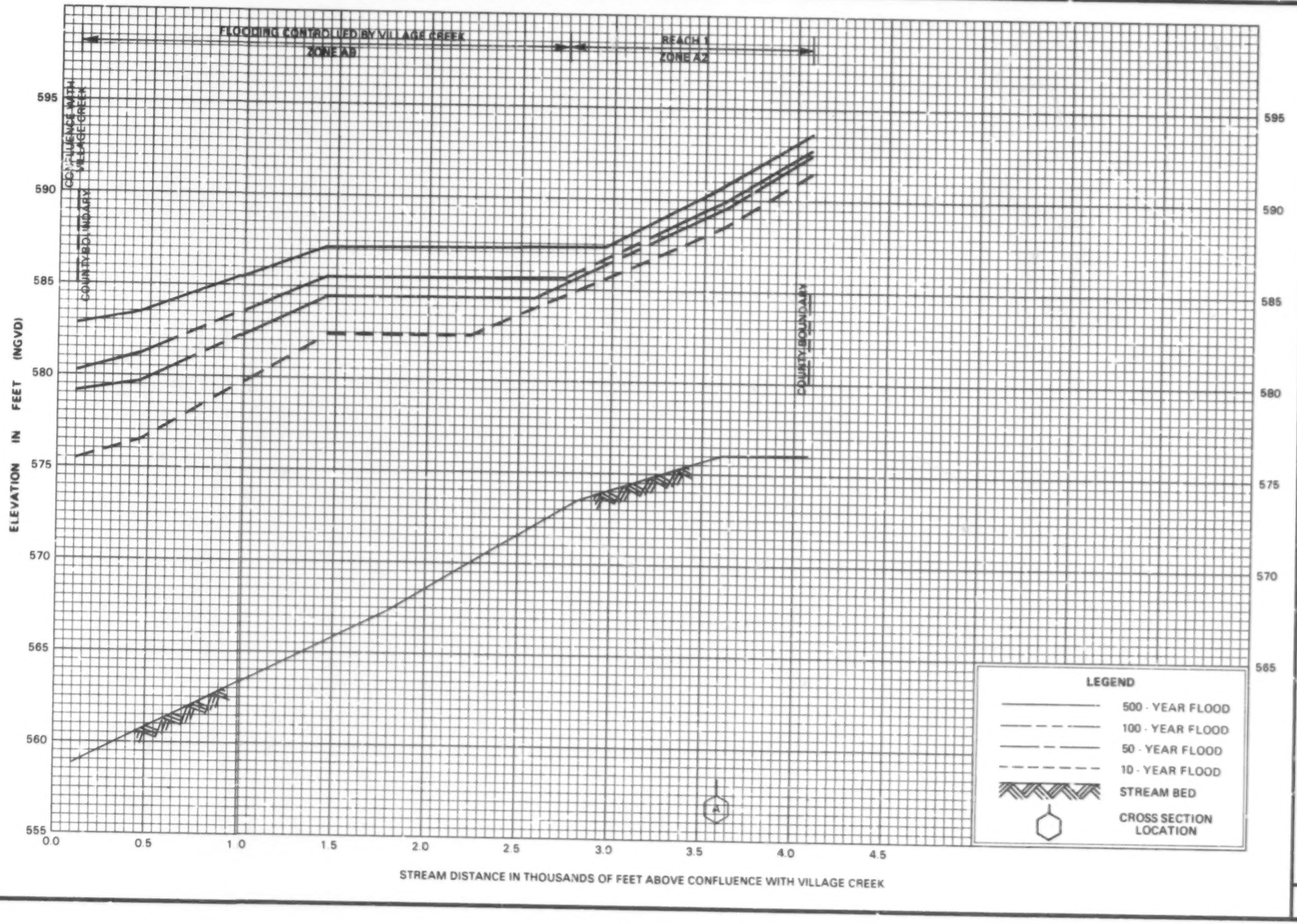

FLOOD PROFILES

CHAMBERS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

13P

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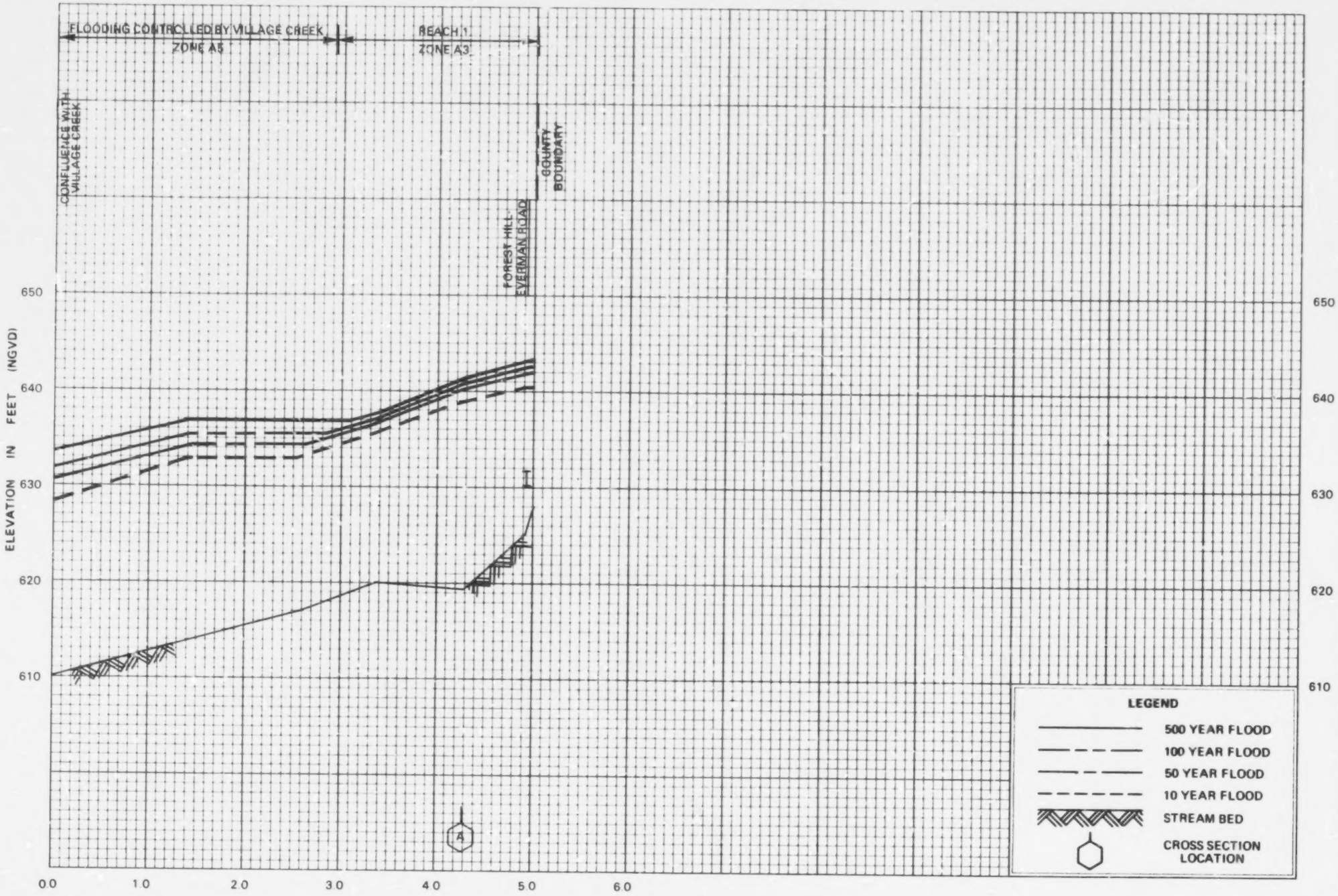

FLOOD PROFILES

DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

14P

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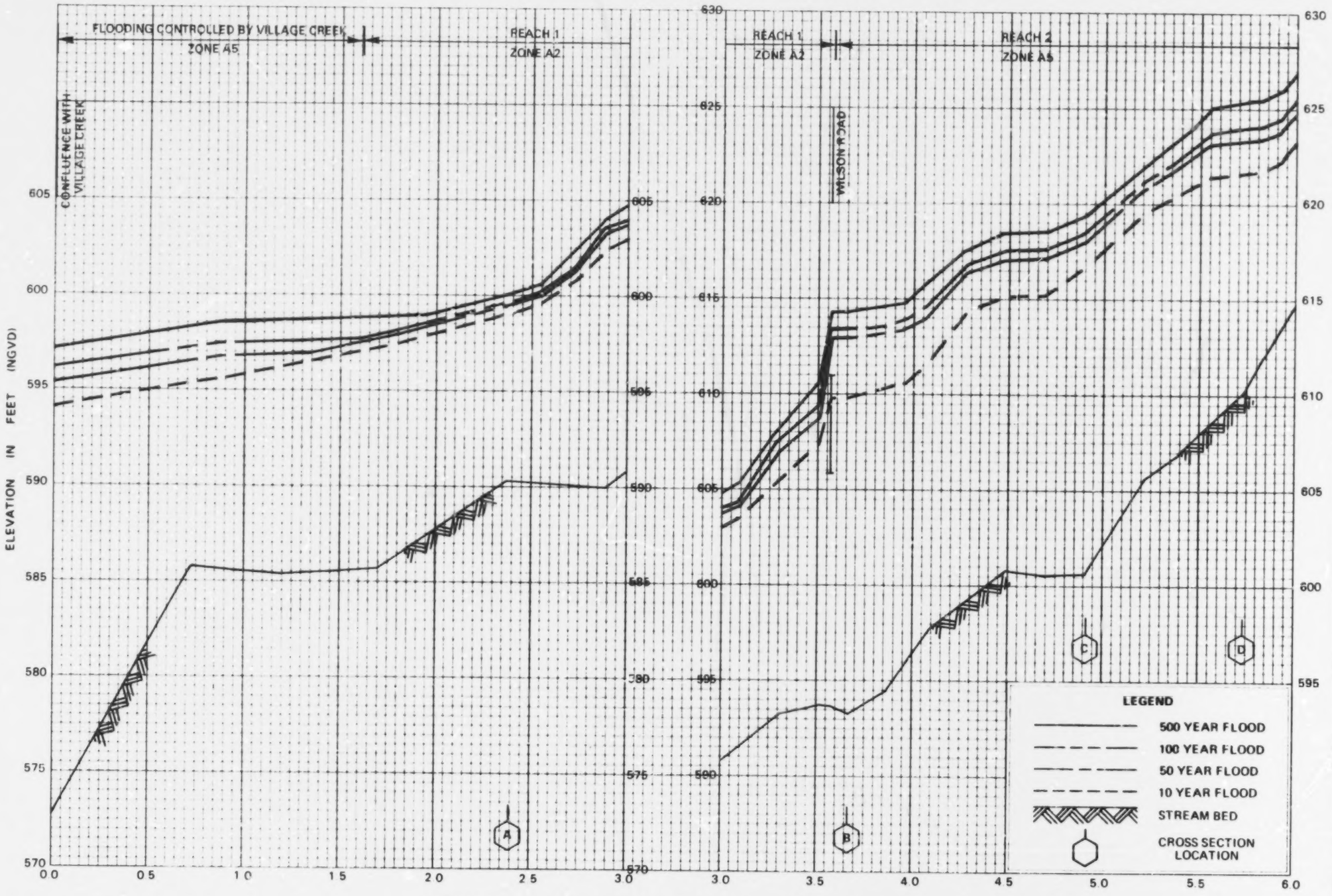

FLOOD PROFILES

ELM BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

15P

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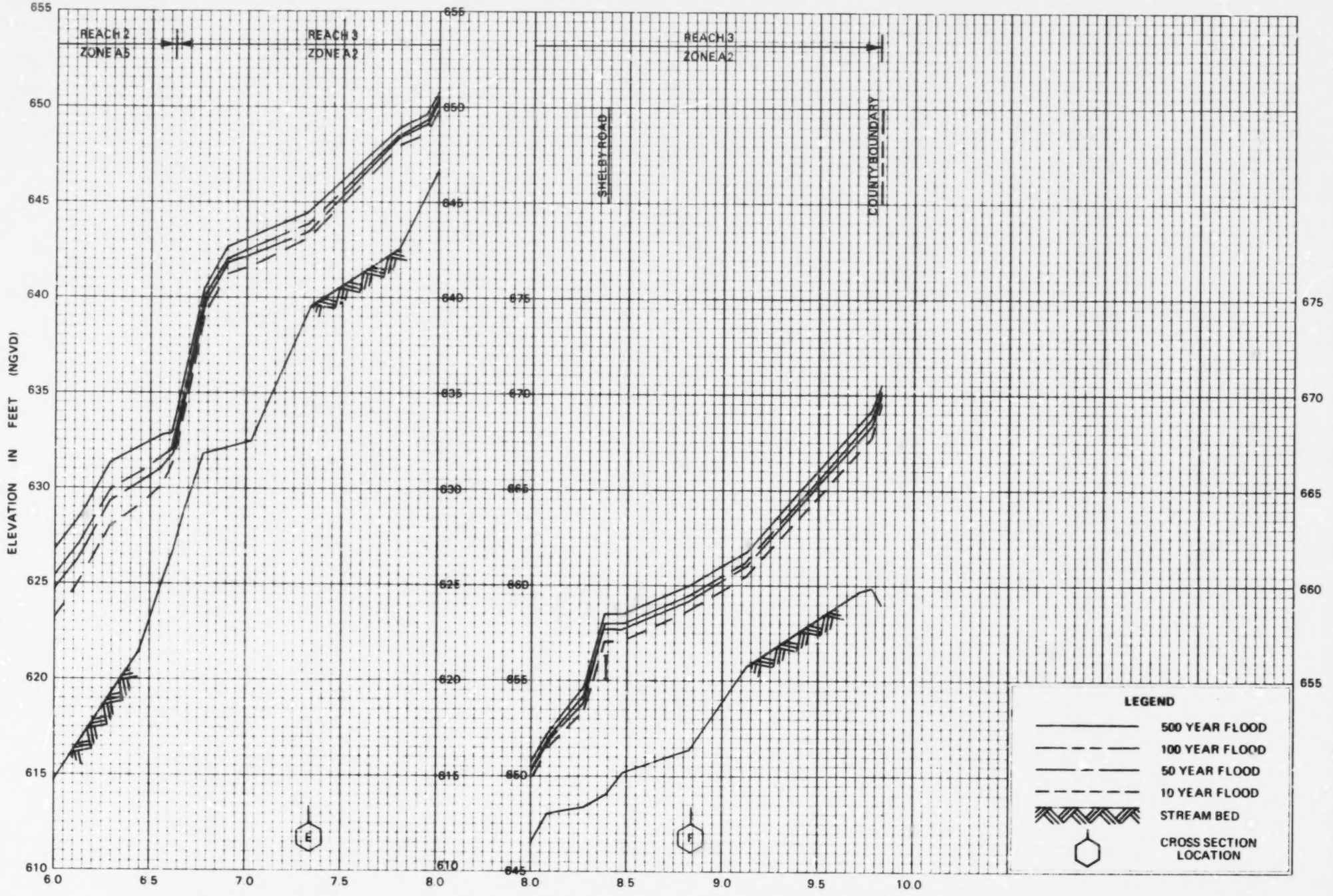

FLOOD PROFILES

ELM BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

16P

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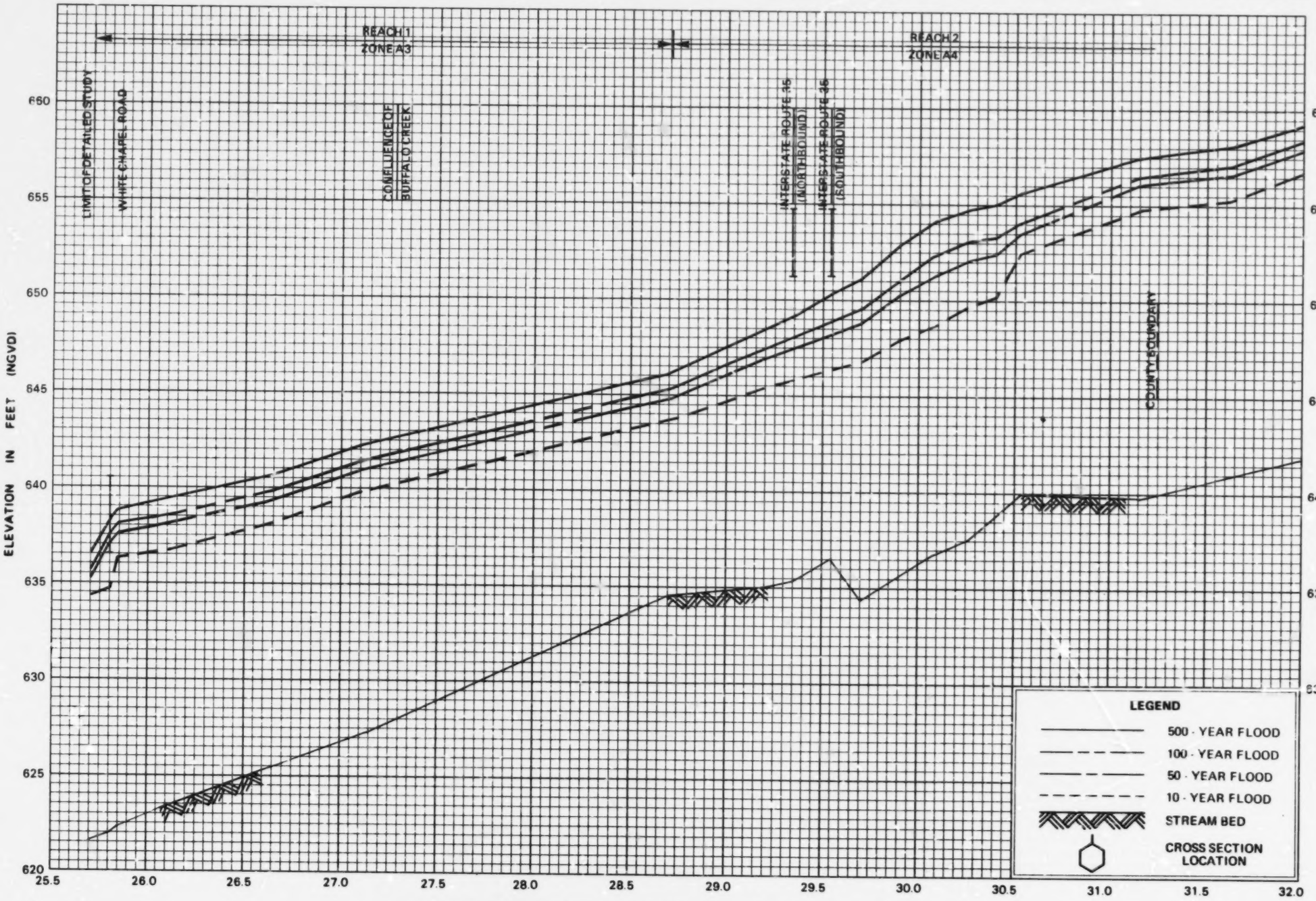

FLOOD PROFILES

HENRIETTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

17P

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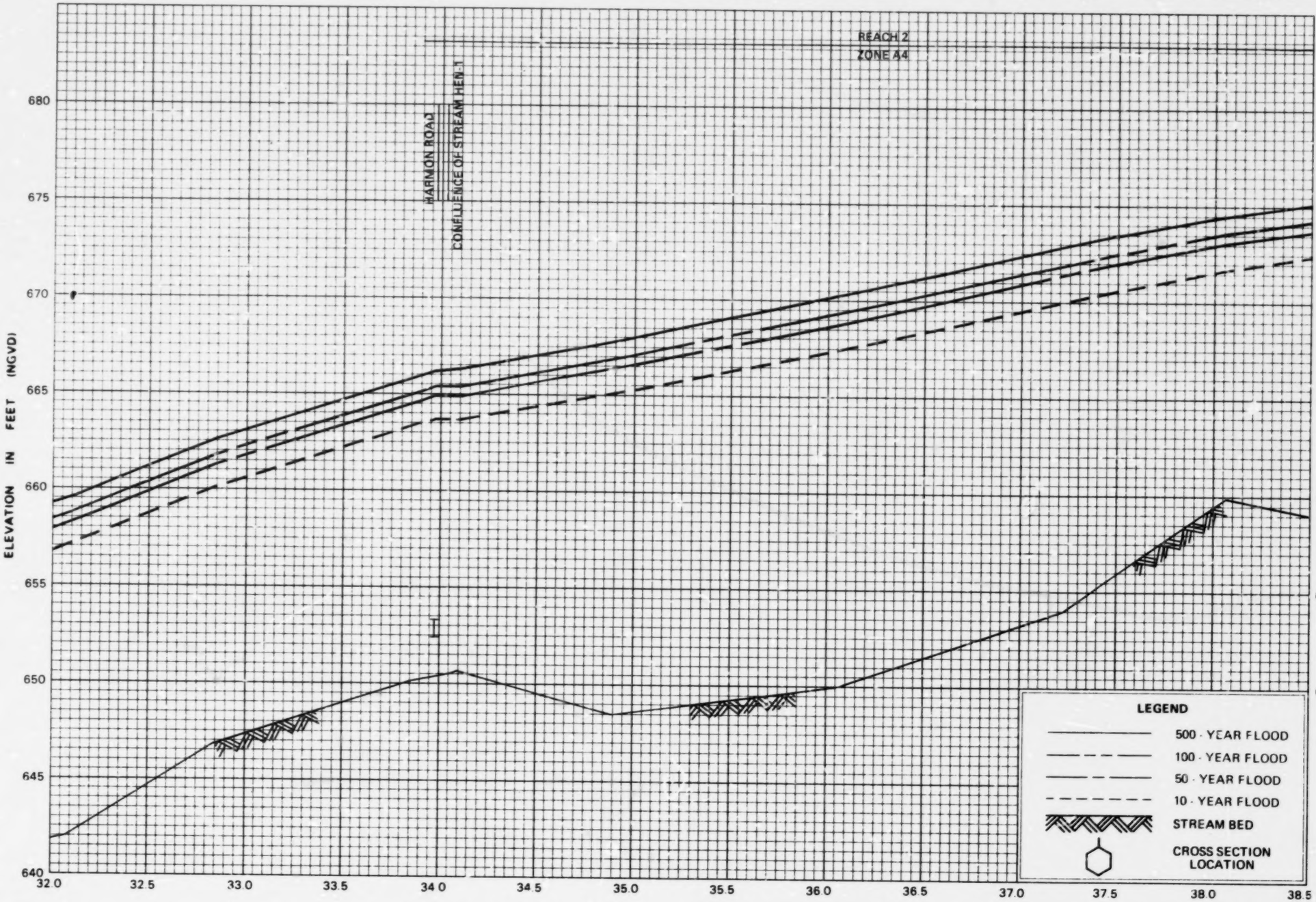

FLOOD PROFILES

HENRIETTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

18P

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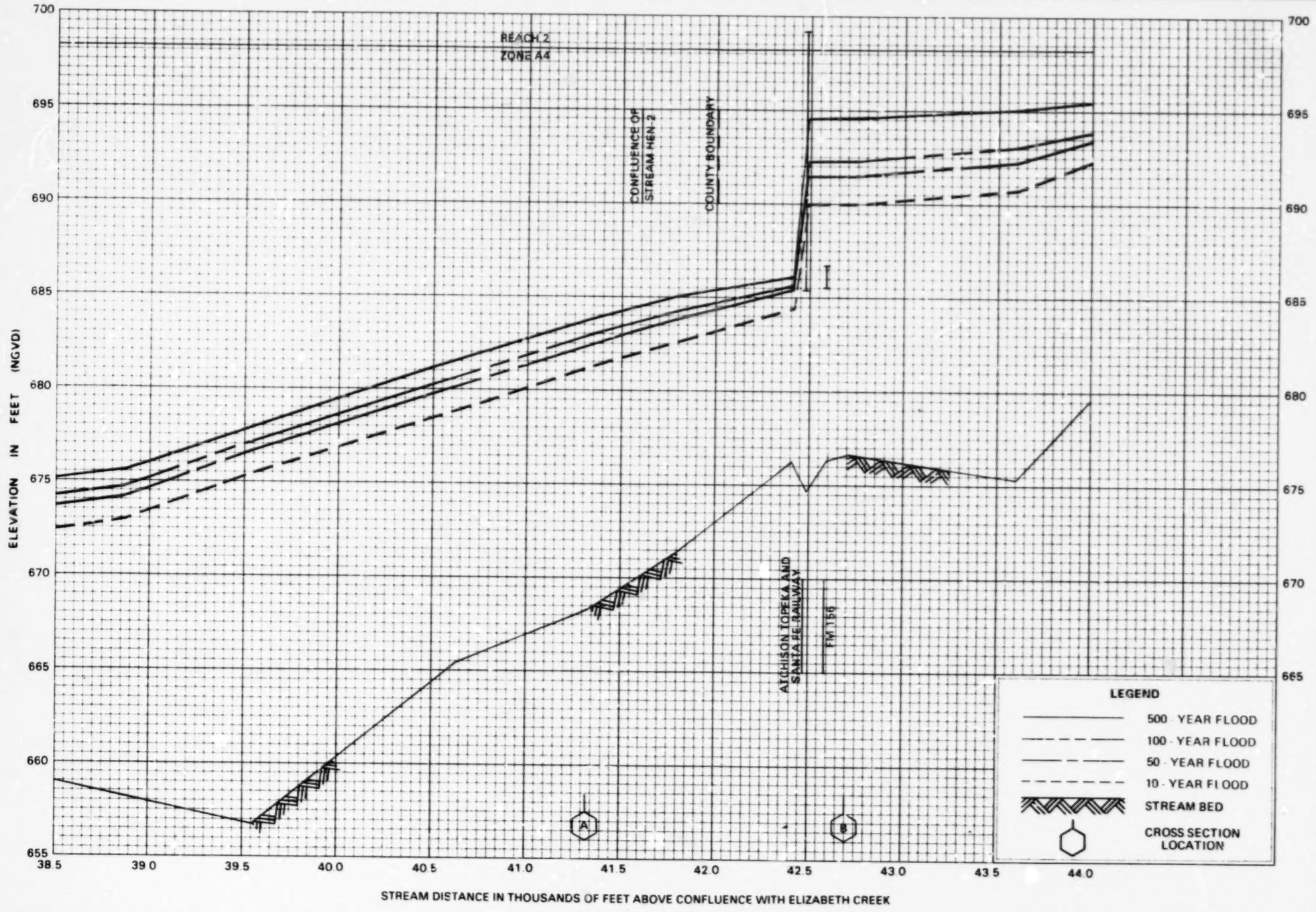

FLOOD PROFILES

HENRIETTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

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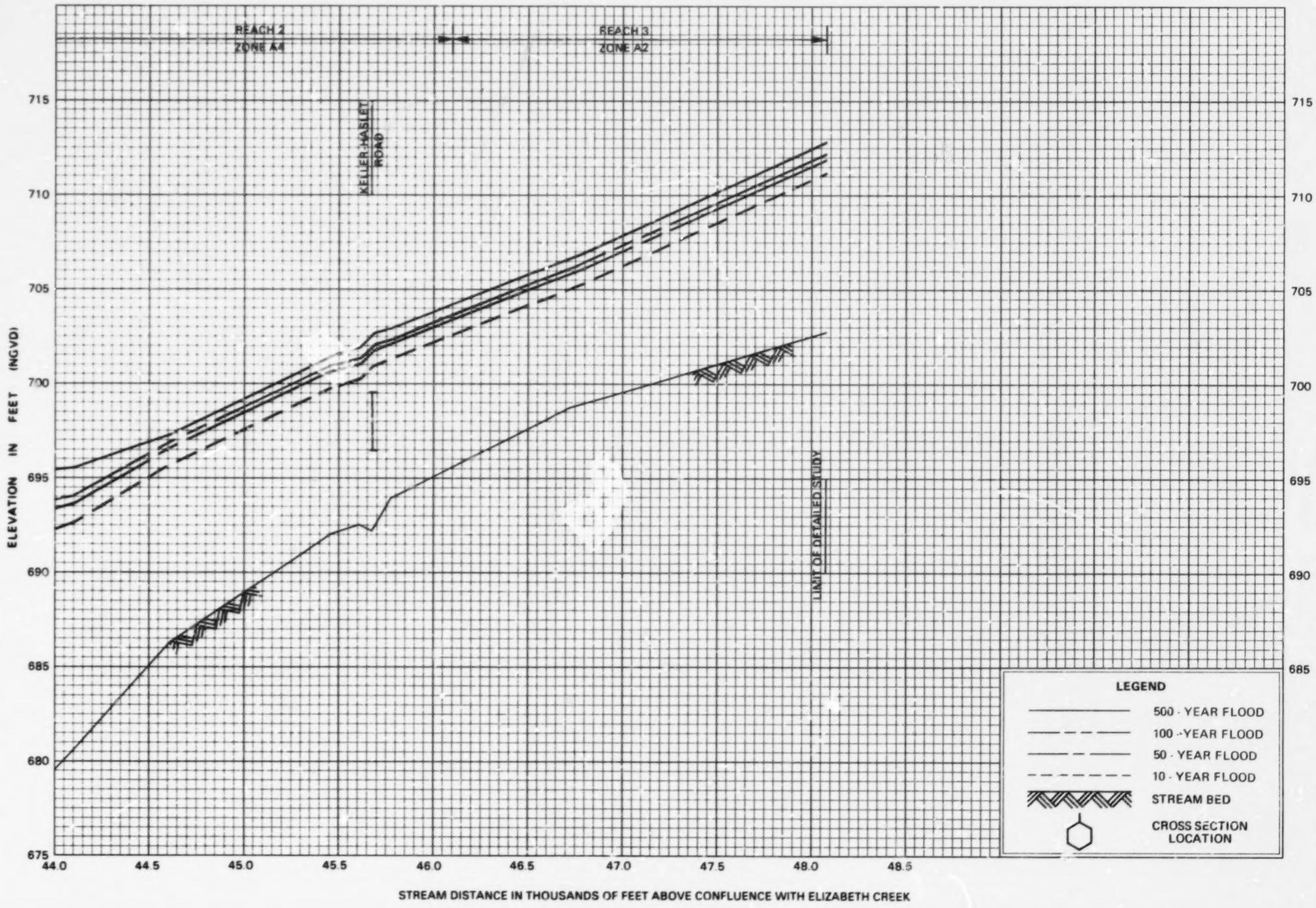

FLOOD PROFILES

HENRIETTA CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

20P

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REACH 1
ZONE AZ

COUNTY BOUNDARY

LIMIT OF DETAILED STUDY

ELEVATION IN FEET (NGVD)

620
618
616
614
612
610
608

45.0 45.2 45.4 45.6 45.8 46.0 46.2

STREAM DISTANCE IN THOUSANDS OF FEET ABOVE CONFLUENCE WITH MOUNTAIN CREEK

LEGEND

- 500 YEAR FLOOD
- 100 YEAR FLOOD
- 50 YEAR FLOOD
- 10 YEAR FLOOD
- STREAM BED
- CROSS SECTION LOCATION

FLOOD PROFILES

LOW BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

21P

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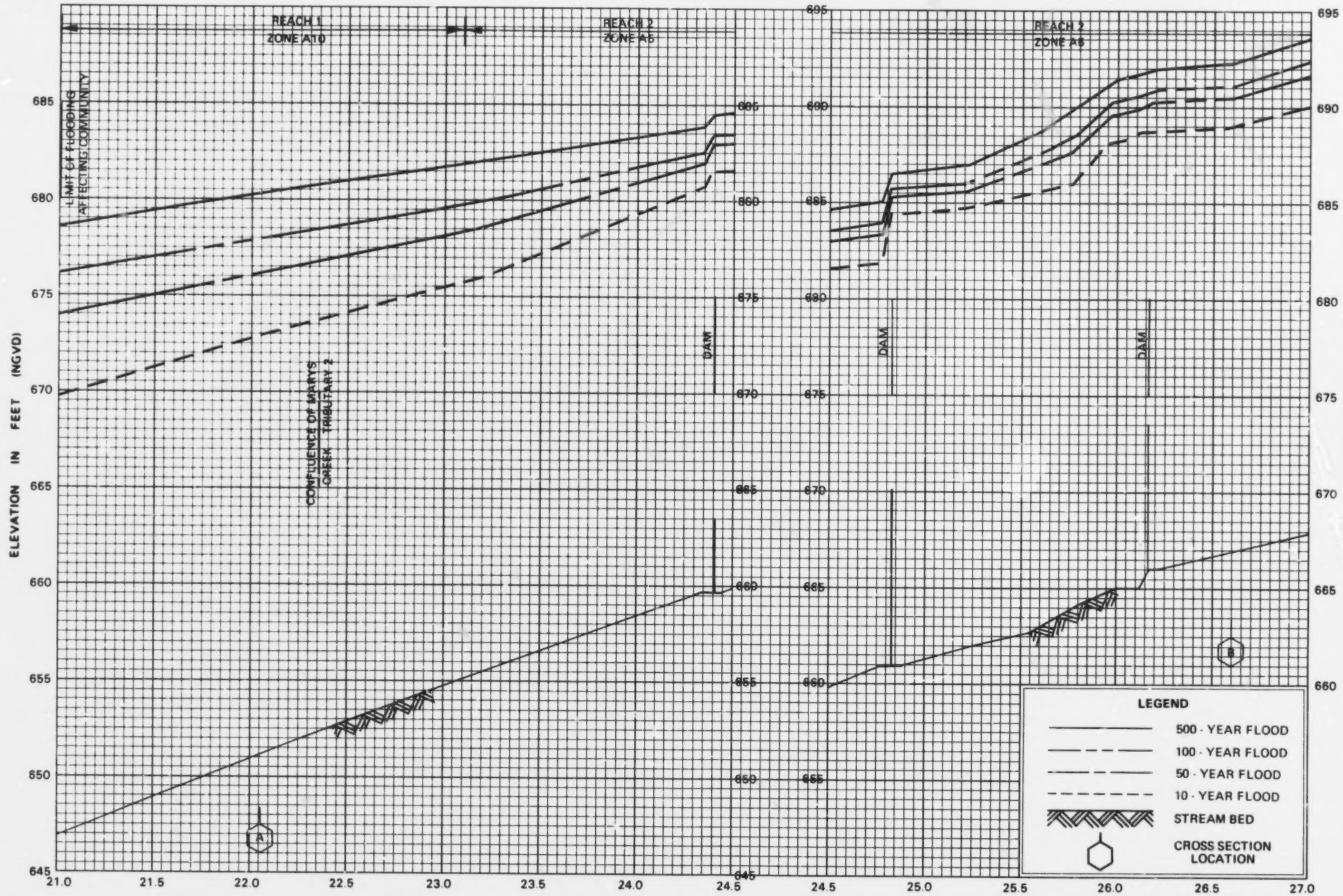

FLOOD PROFILES

MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

22P

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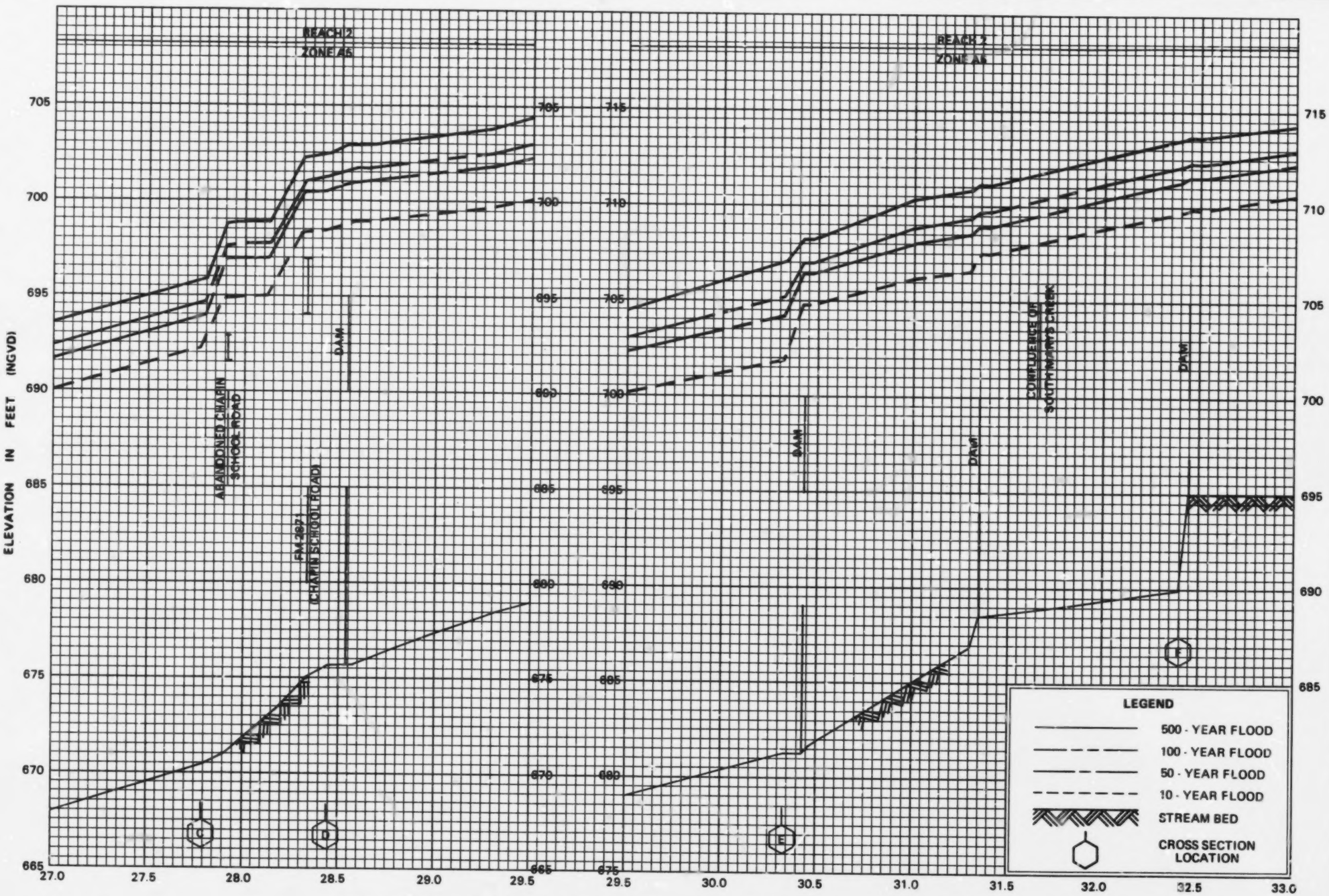

FLOOD PROFILES

MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

23P

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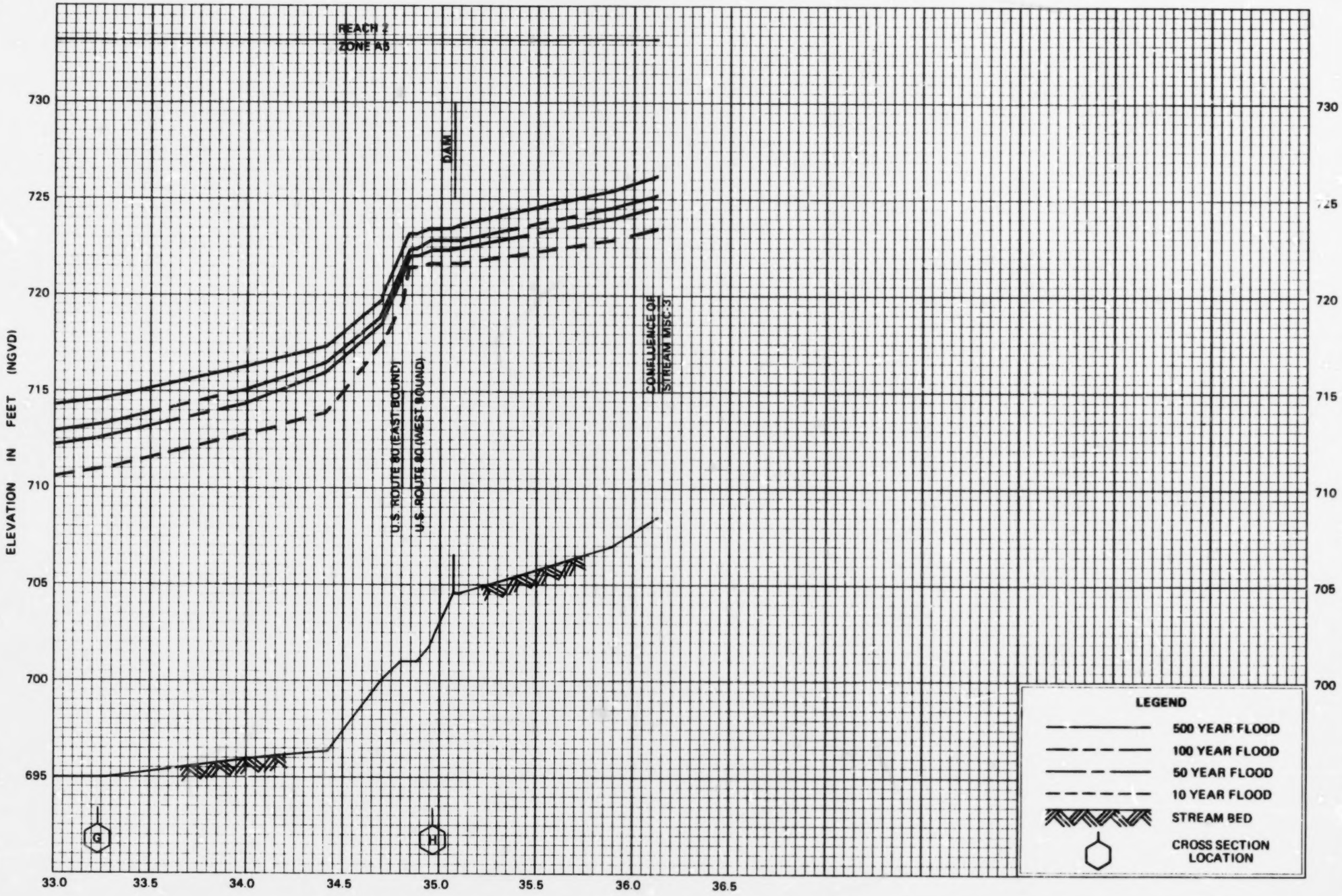

FLOOD PROFILES

MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

24P

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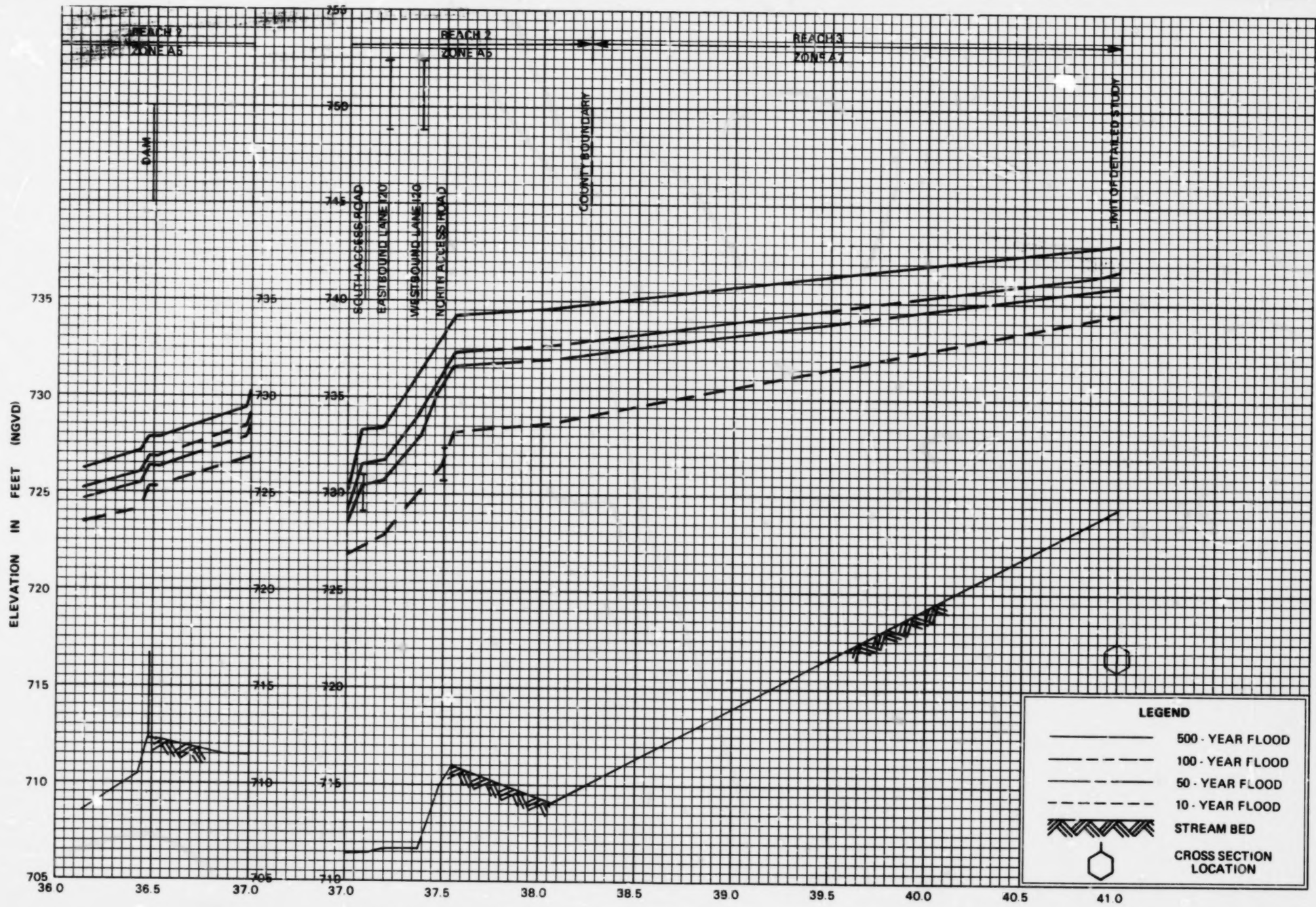

FLOOD PROFILES

MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

25P

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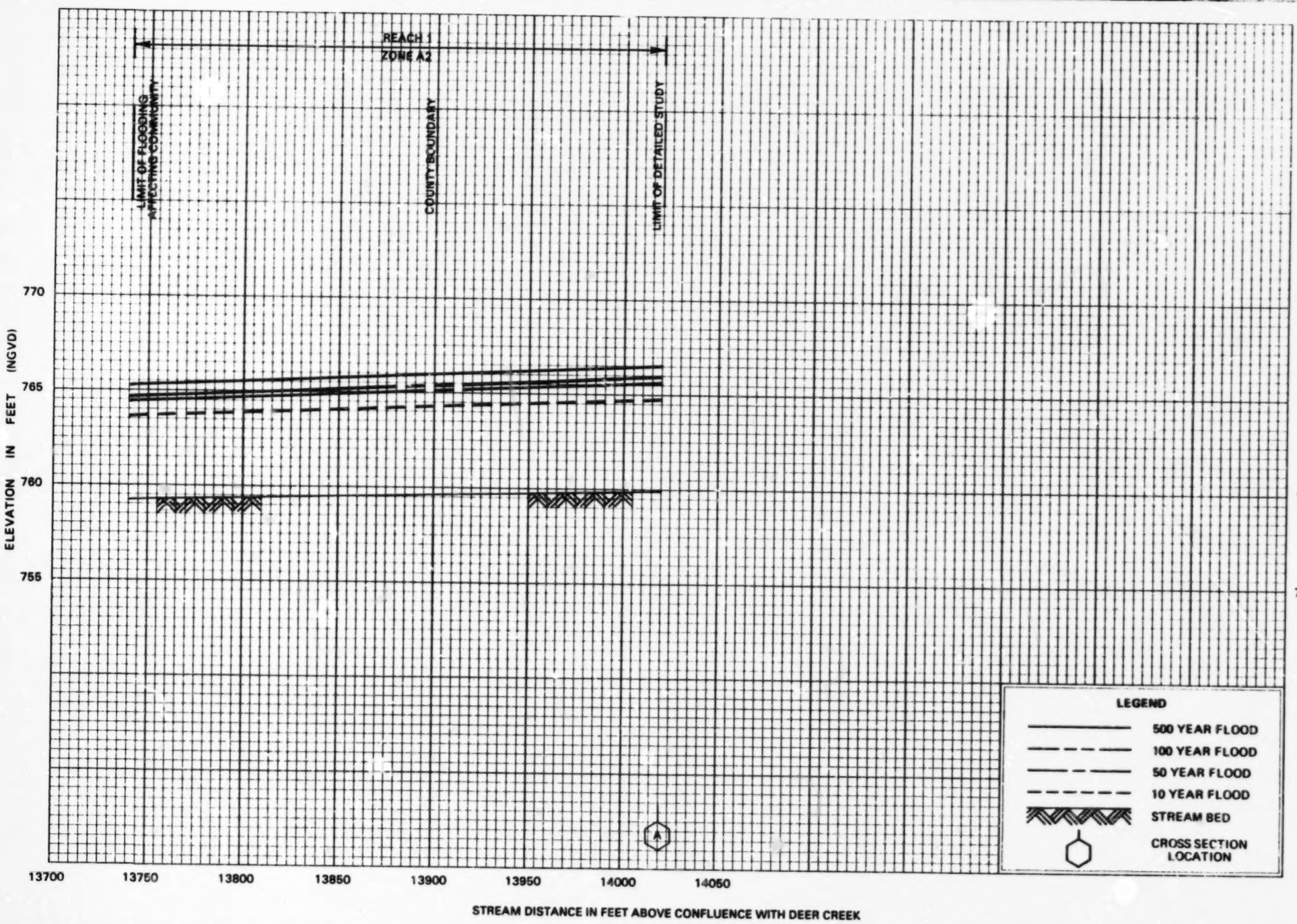

FLOOD PROFILES

NORTH BRANCH OF DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

26P

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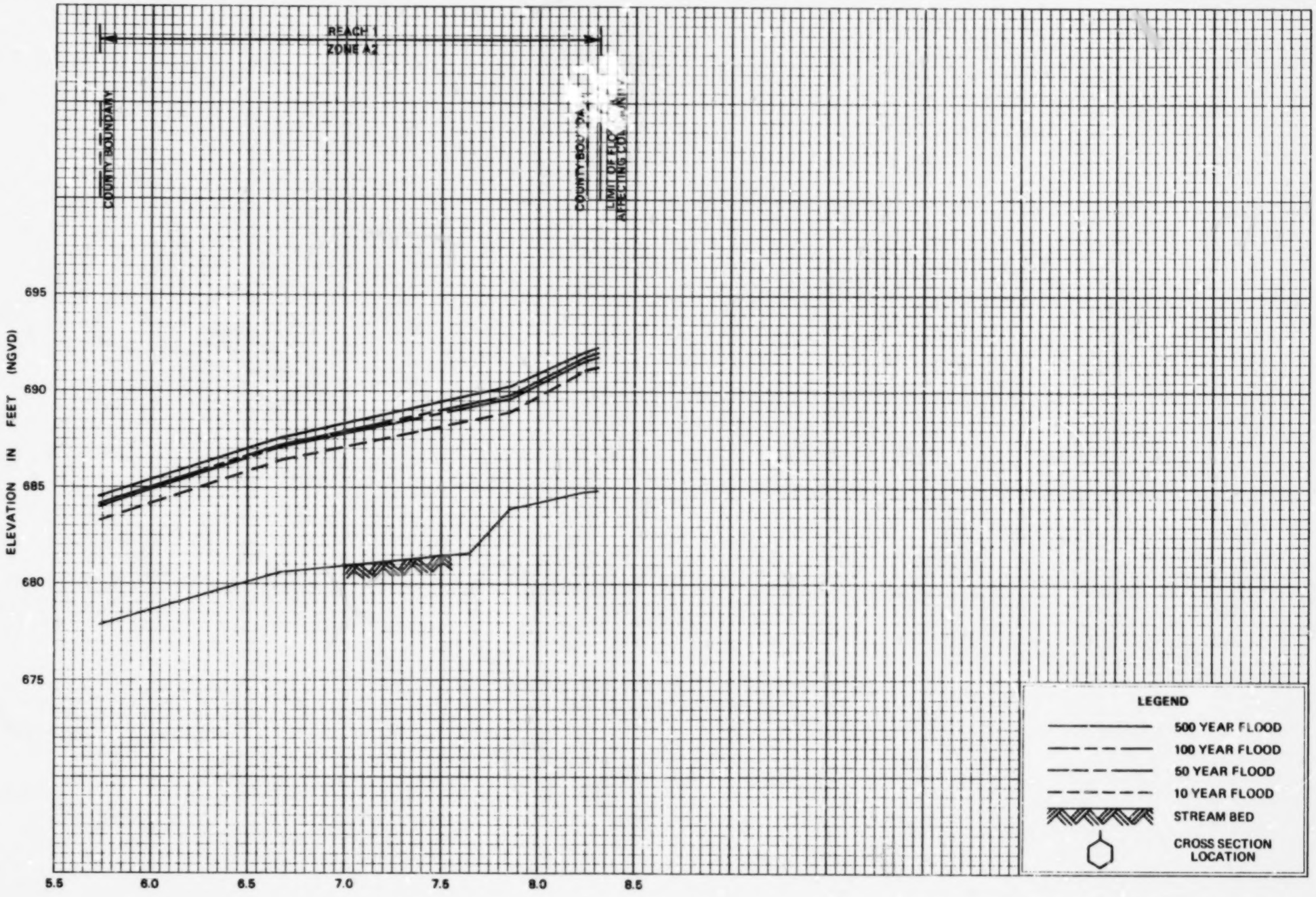


FLOOD PROFILES

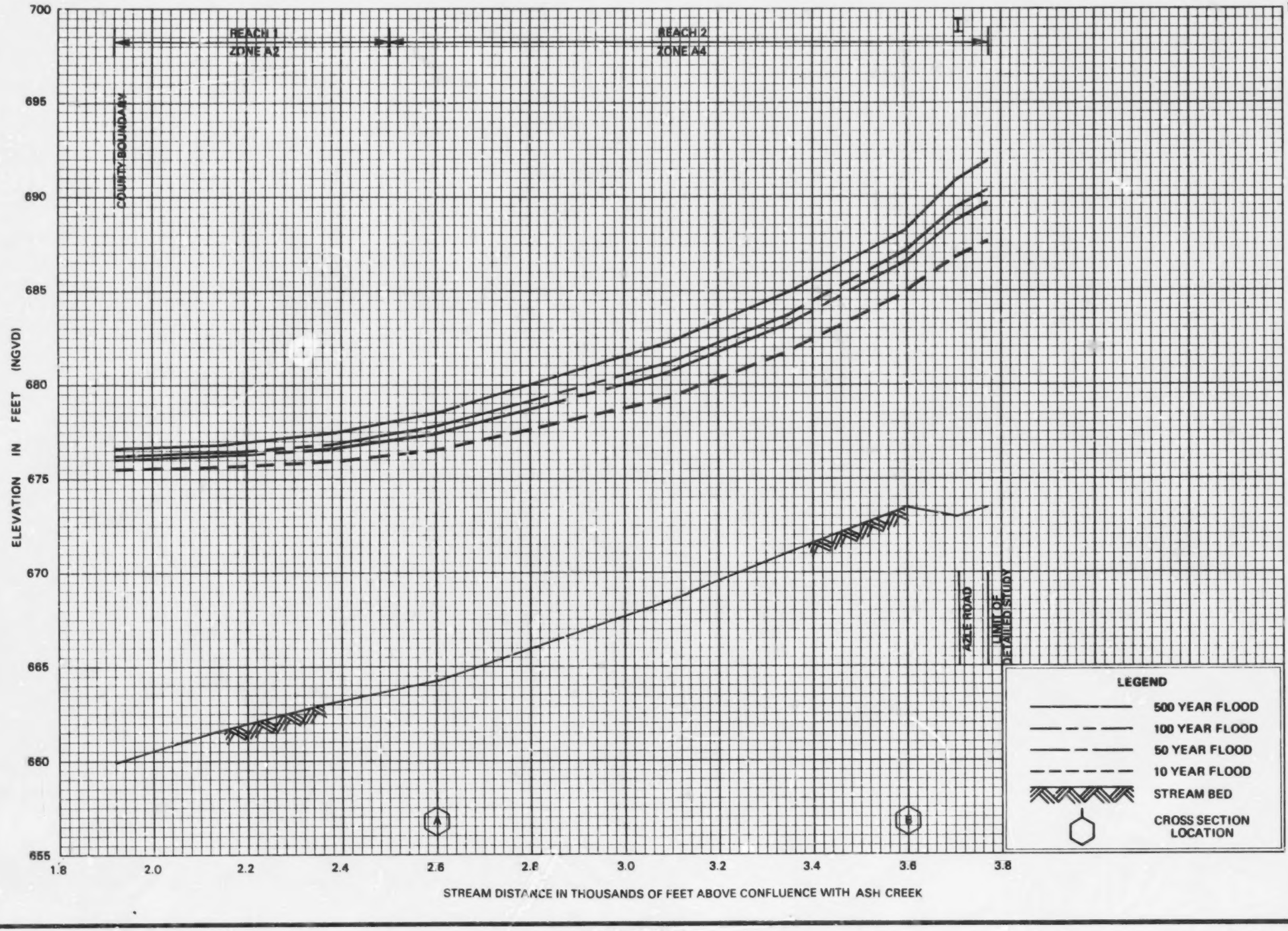
NORTH CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

27P

BEST COPY AVAILABLE



FLOOD PROFILES

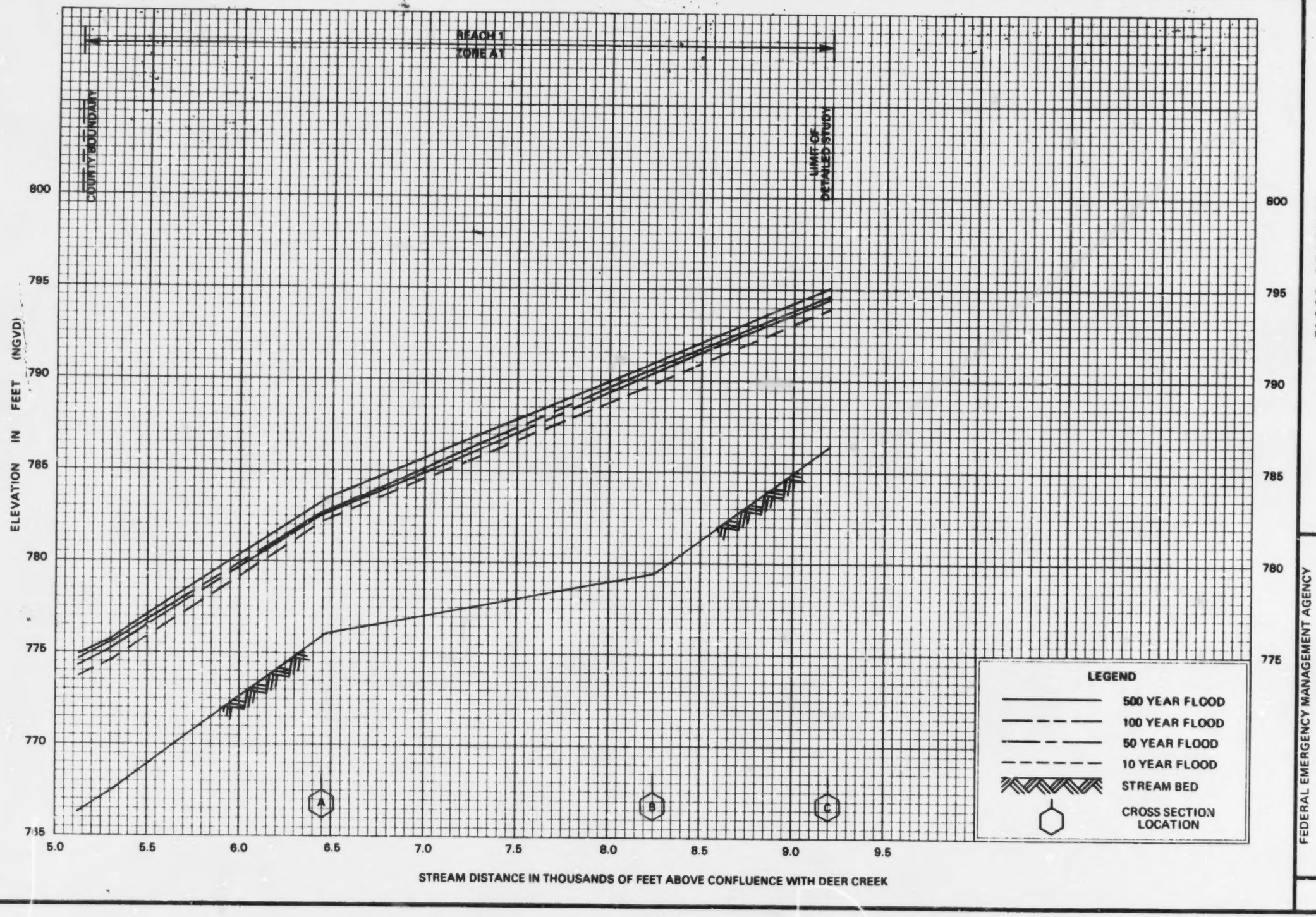
PASCHAL BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

28P

BEST COPY AVAILABLE



FLOOD PROFILES

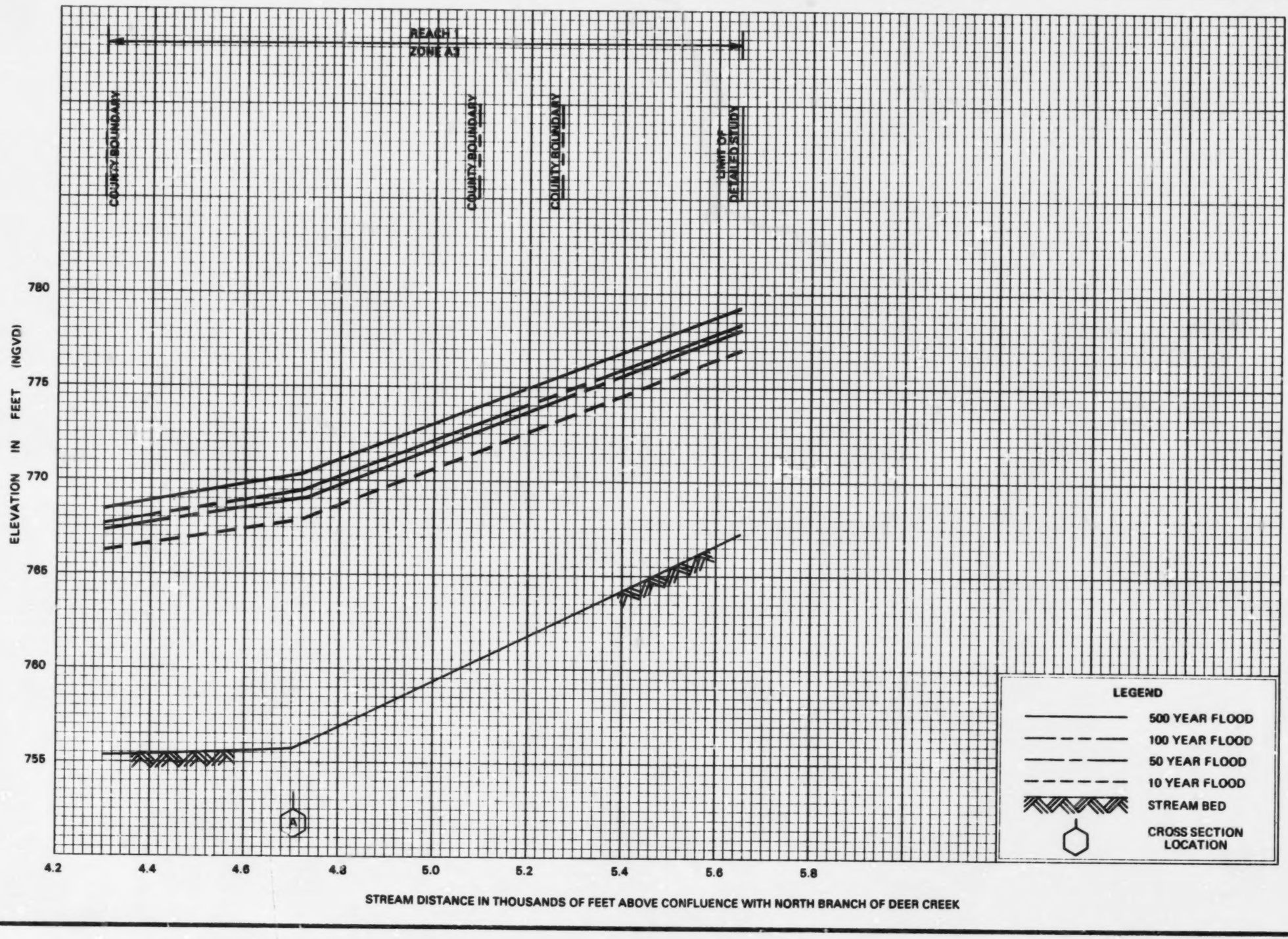
SOUTH FORK OF DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

29P

BEST COPY AVAILABLE



FLOOD PROFILES

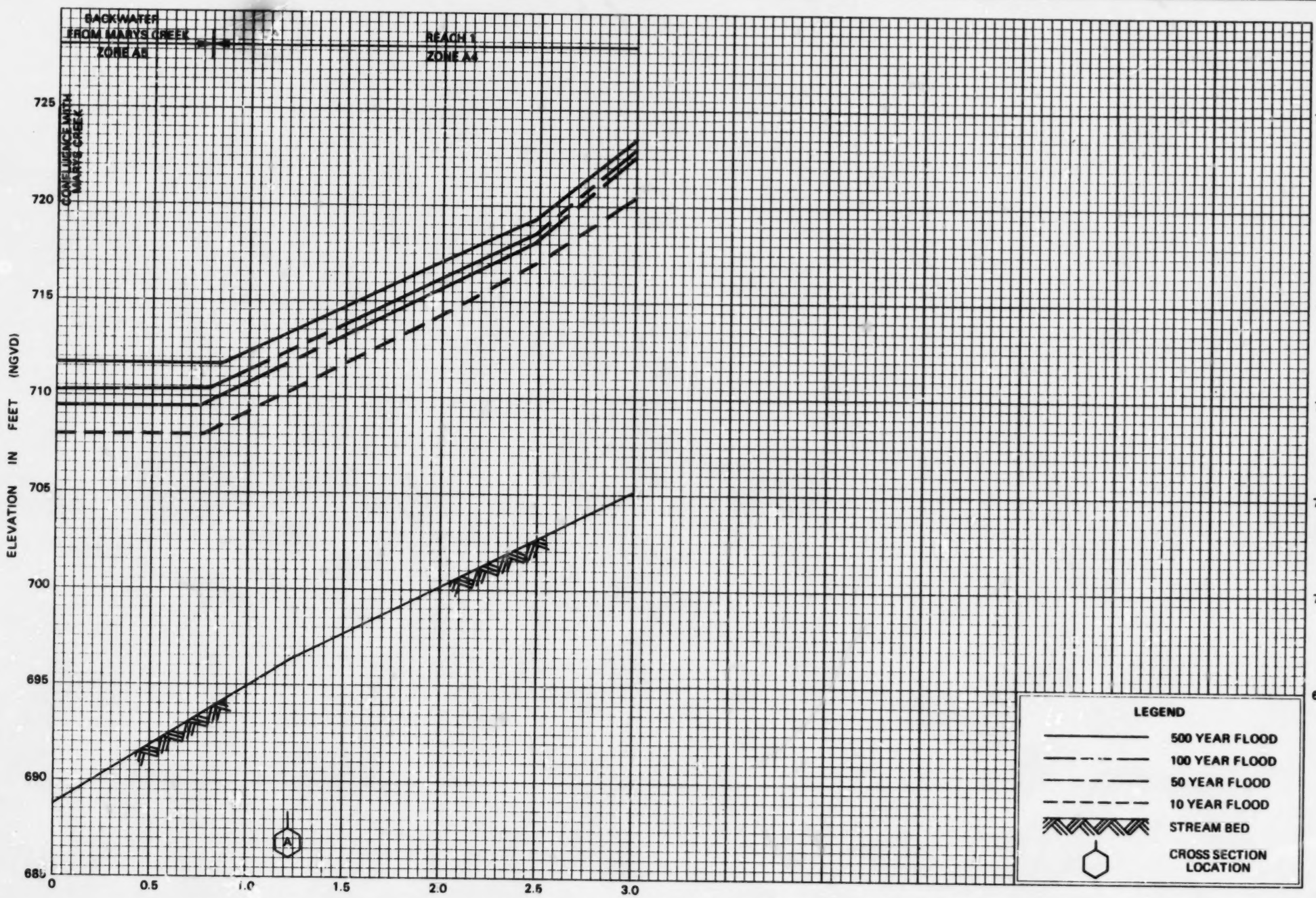
SOUTH FORK OF NORTH BRANCH OF DEER CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

30P

BEST COPY AVAILABLE



FLOOD PROFILES

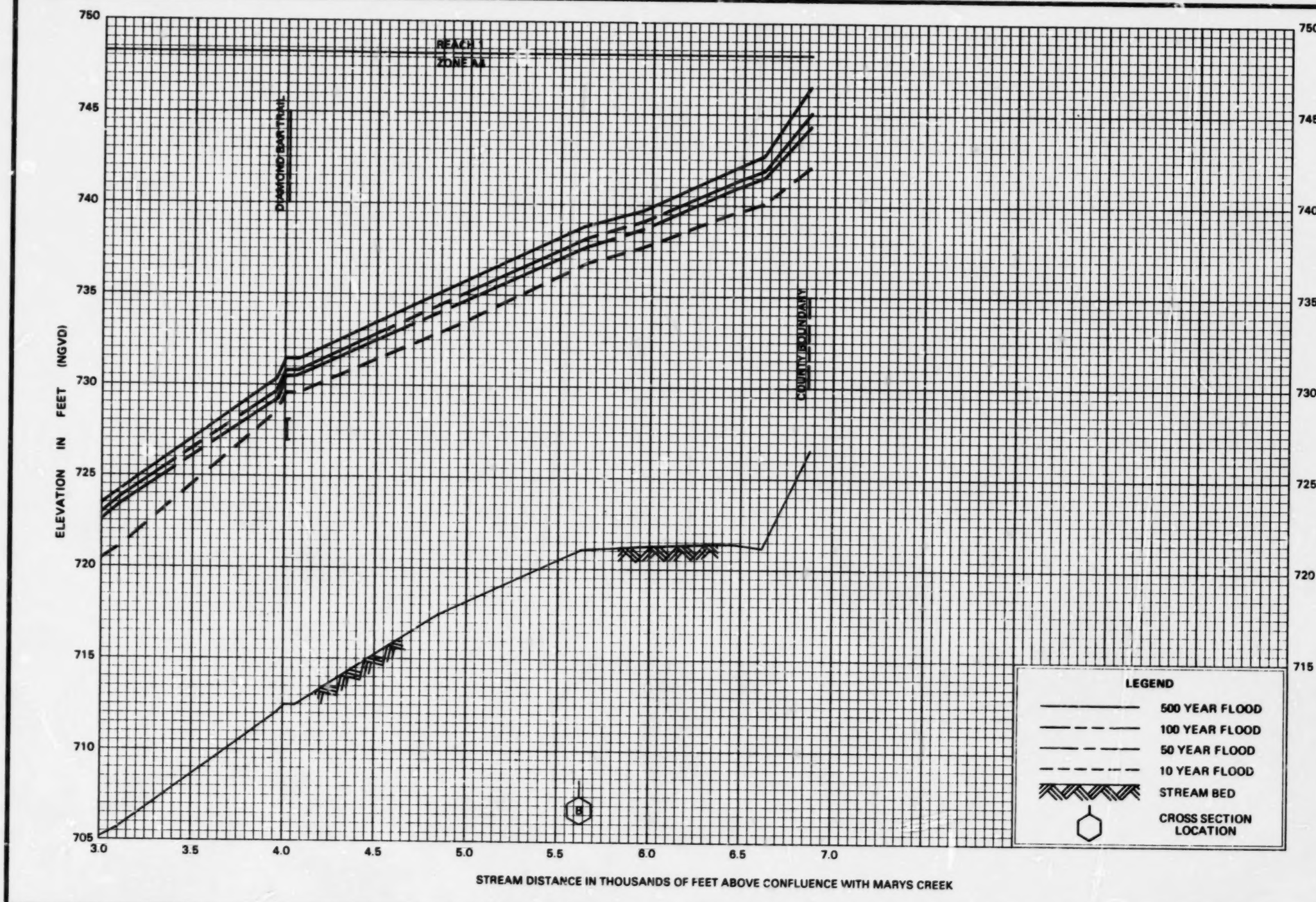
SOUTH MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

31P

BEST COPY AVAILABLE



FLOOD PROFILES

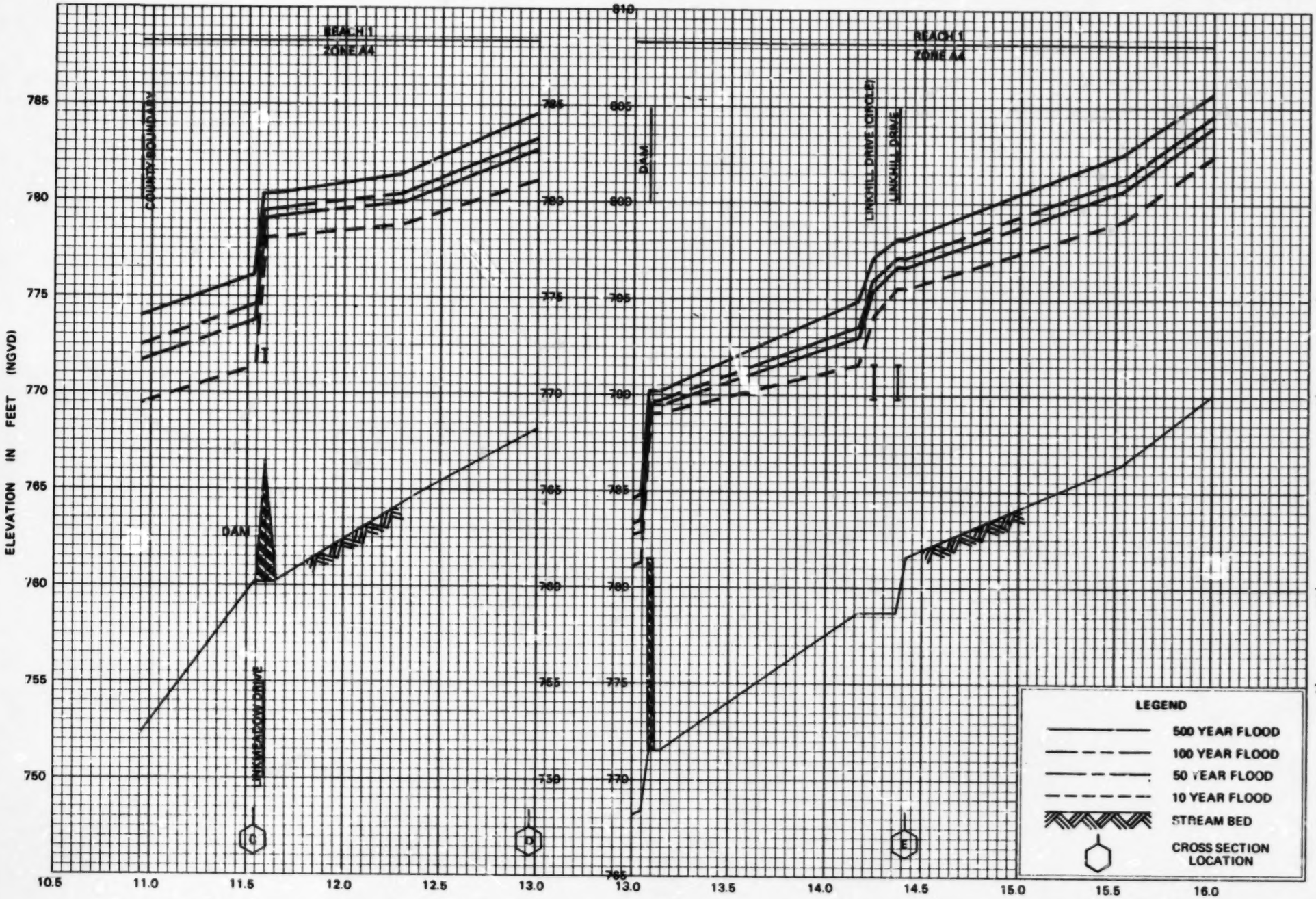
SOUTH MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

32P

BEST COPY AVAILABLE



FLOOD PROFILES

SOUTH MARYS CREEK

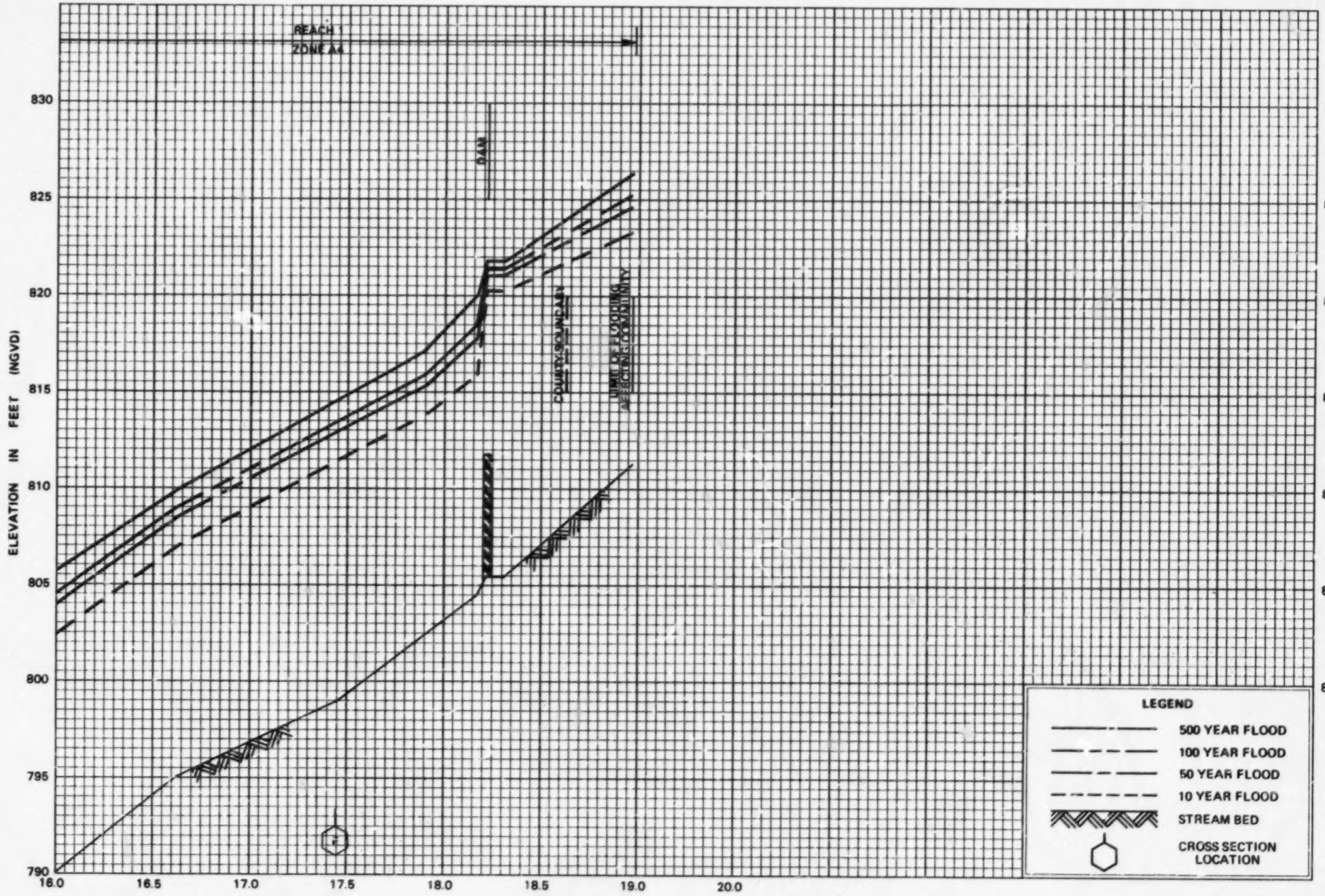
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

33P

BEST COPY AVAILABLE



FLOOD PROFILES

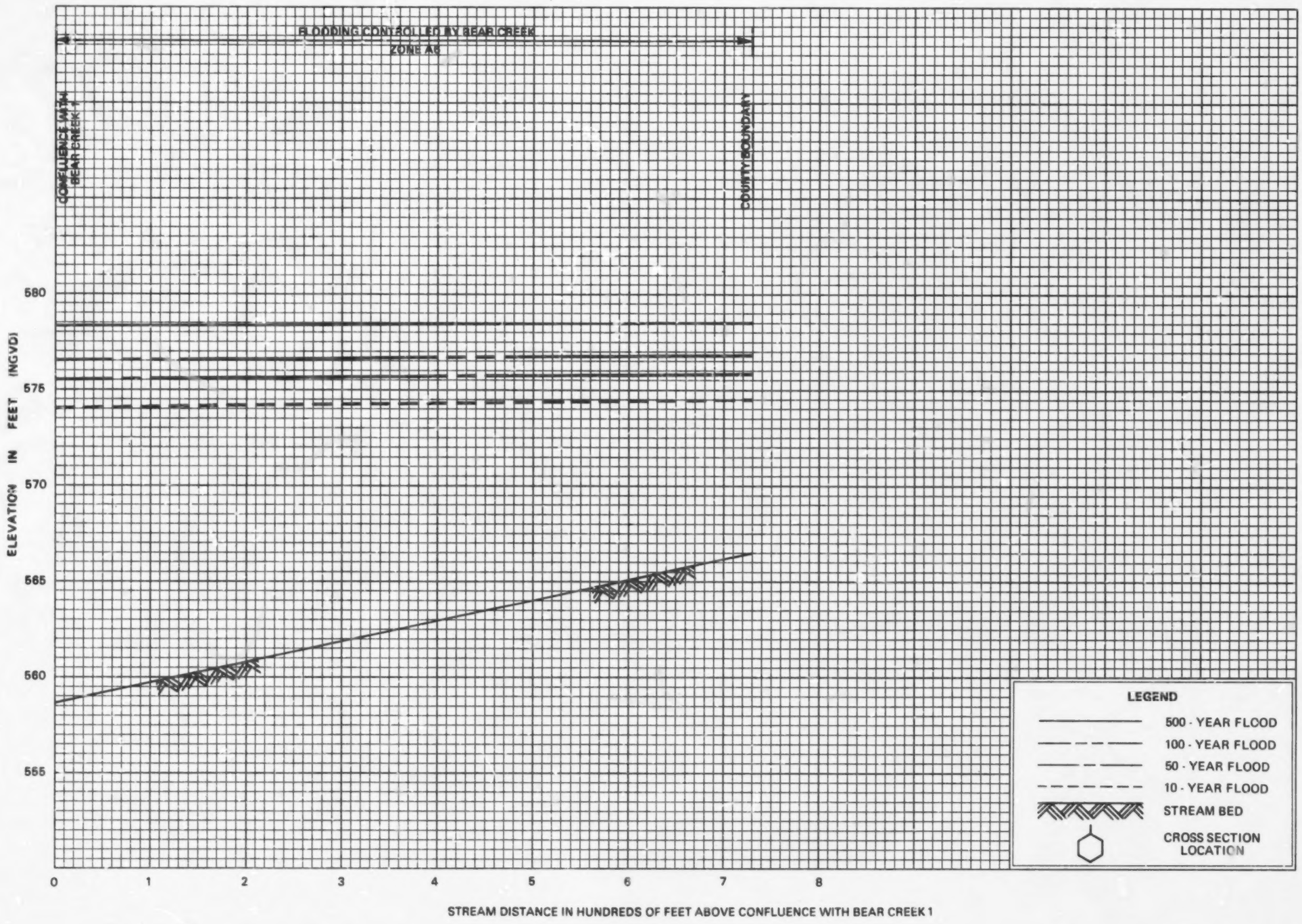
SOUTH MARYS CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

34P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM BB-6

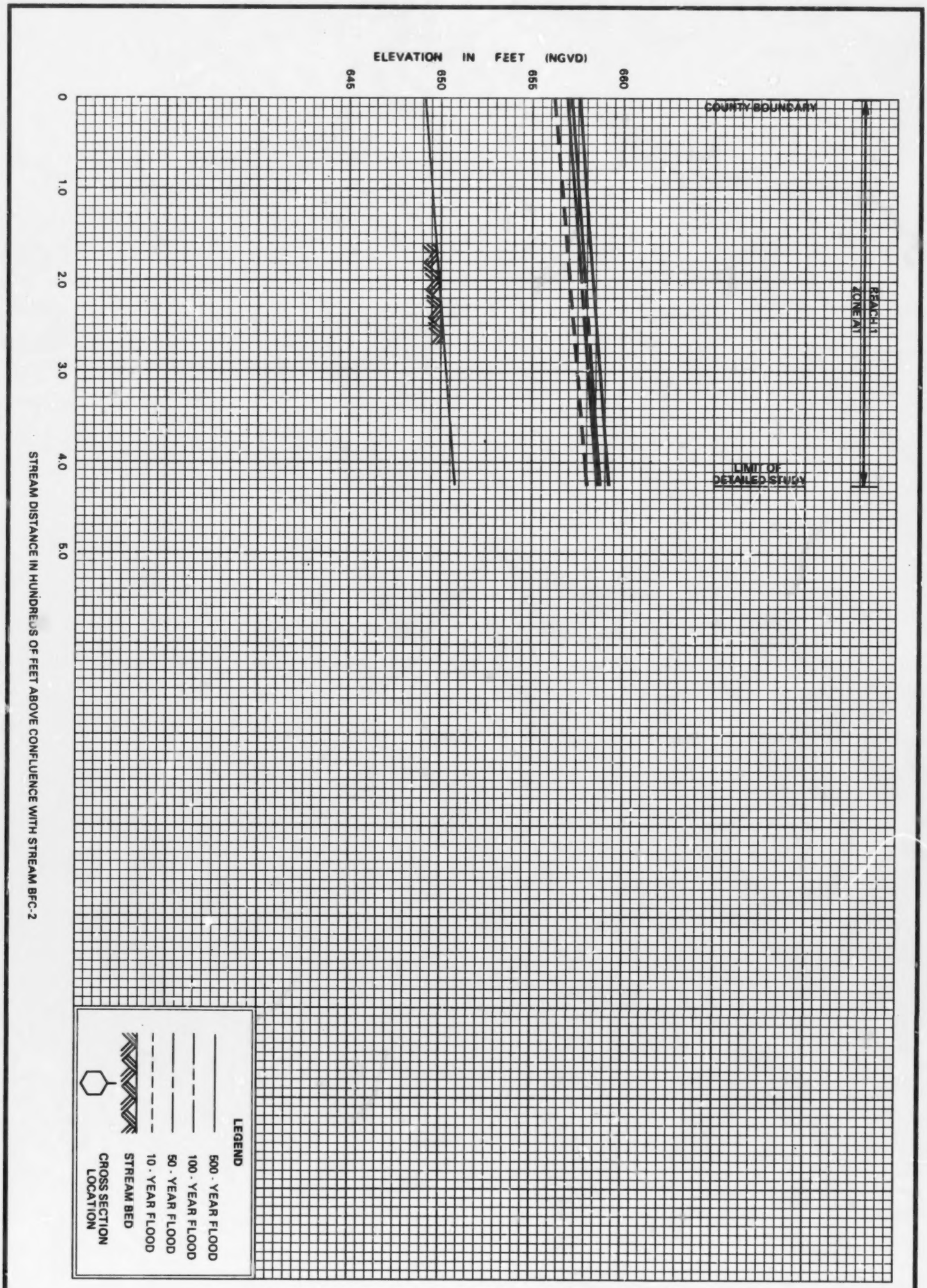
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

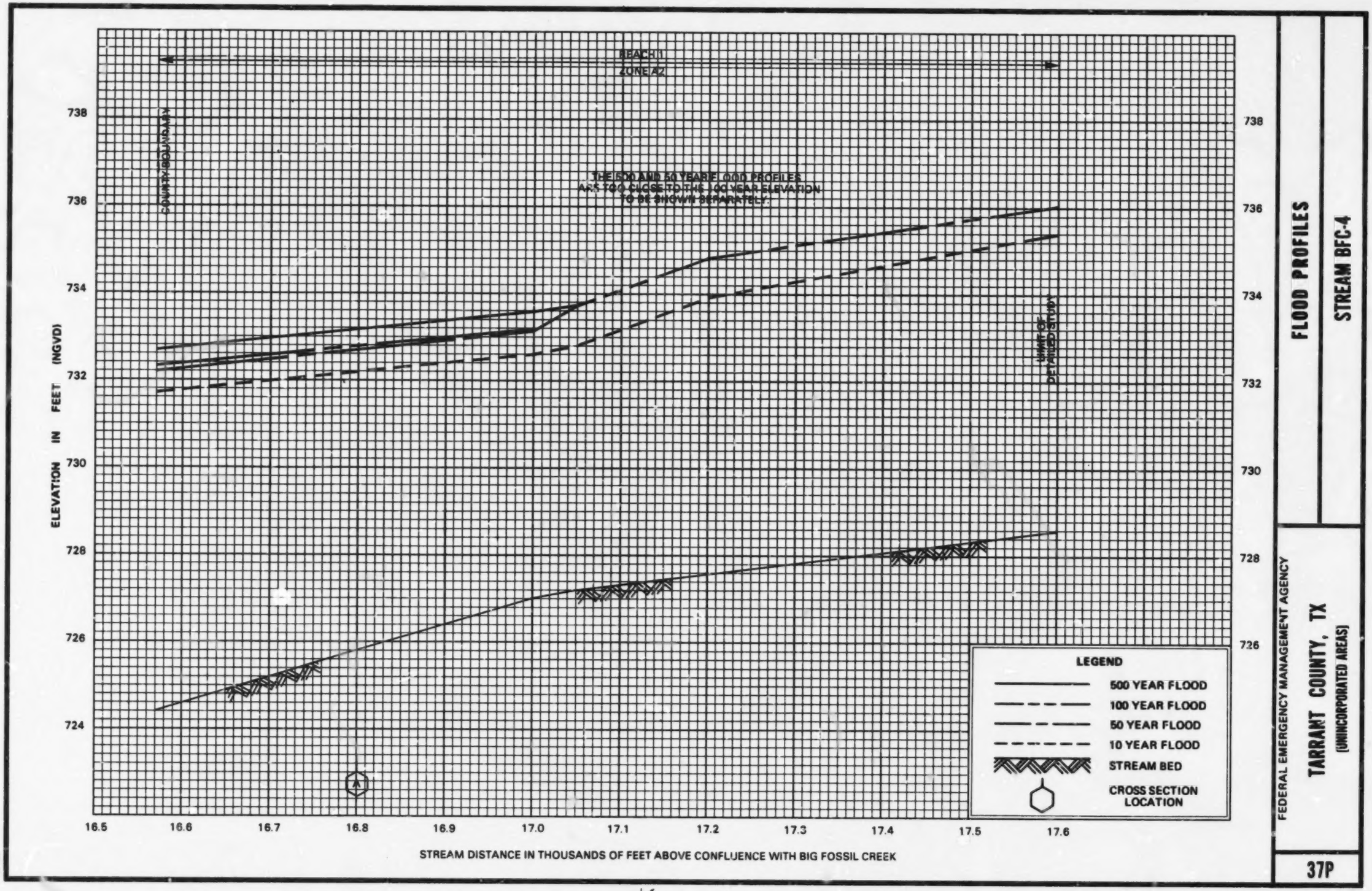
35P

BEST COPY AVAILABLE



36P	FEDERAL EMERGENCY MANAGEMENT AGENCY **TARRANT COUNTY, TX** (UNINCORPORATED AREAS)	**FLOOD PROFILES** **STREAM BFC-2A**

BEST COPY AVAILABLE



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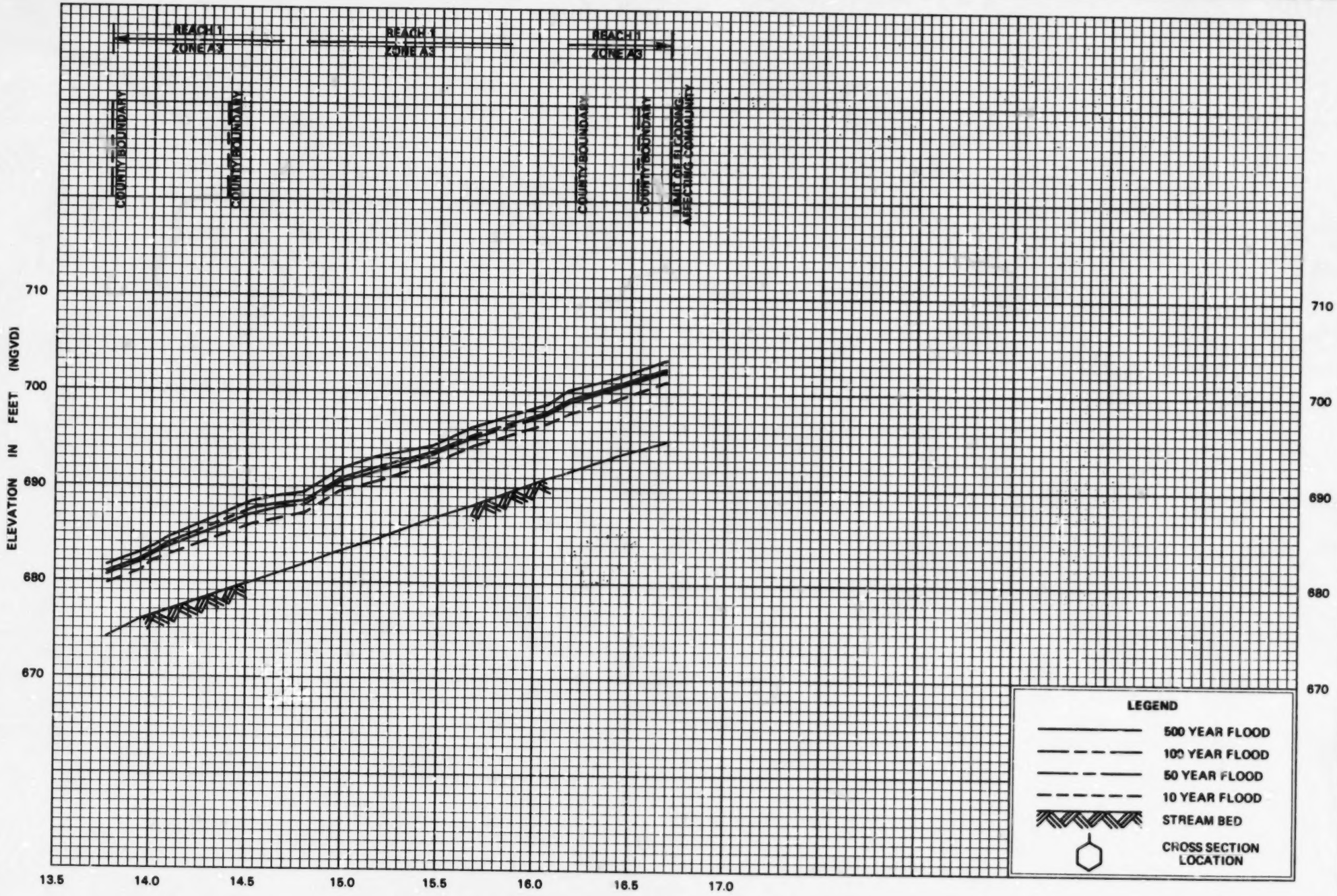


FLOOD PROFILES

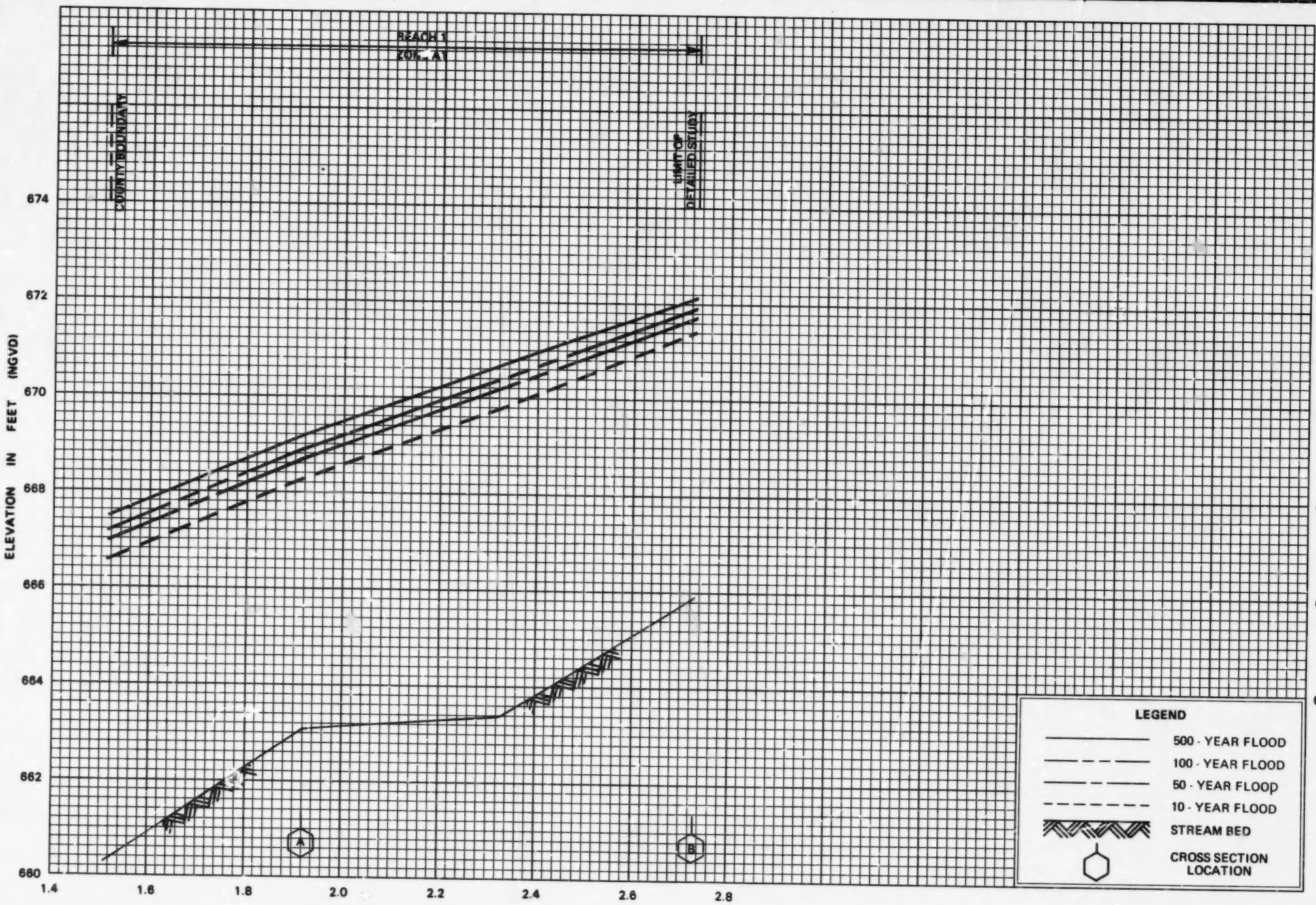
STREAM CF-5

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

38P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM HEN-1

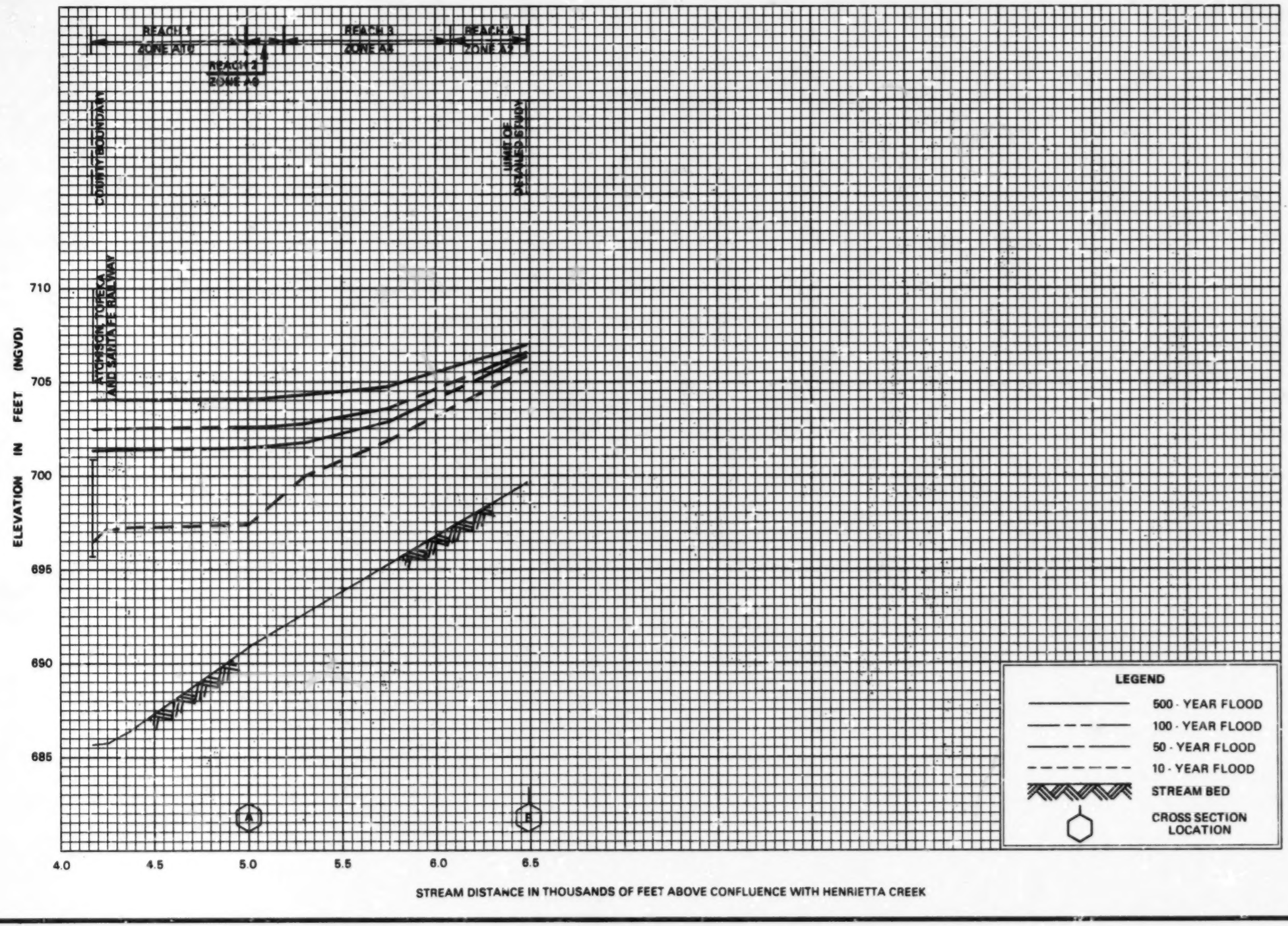
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

39P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM HEN-2

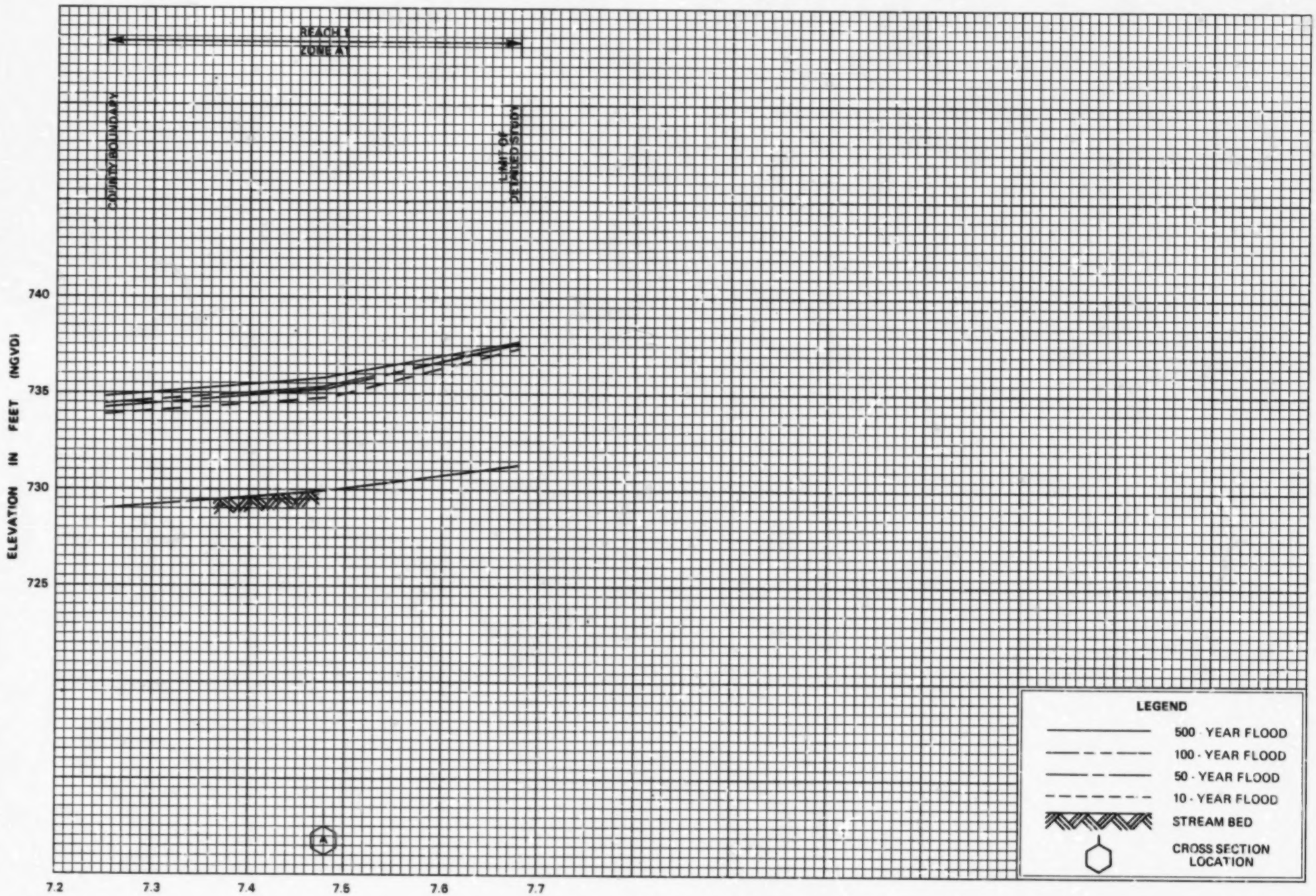
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

40P

BEST COPY AVAILABLE



FLOOD PROFILES

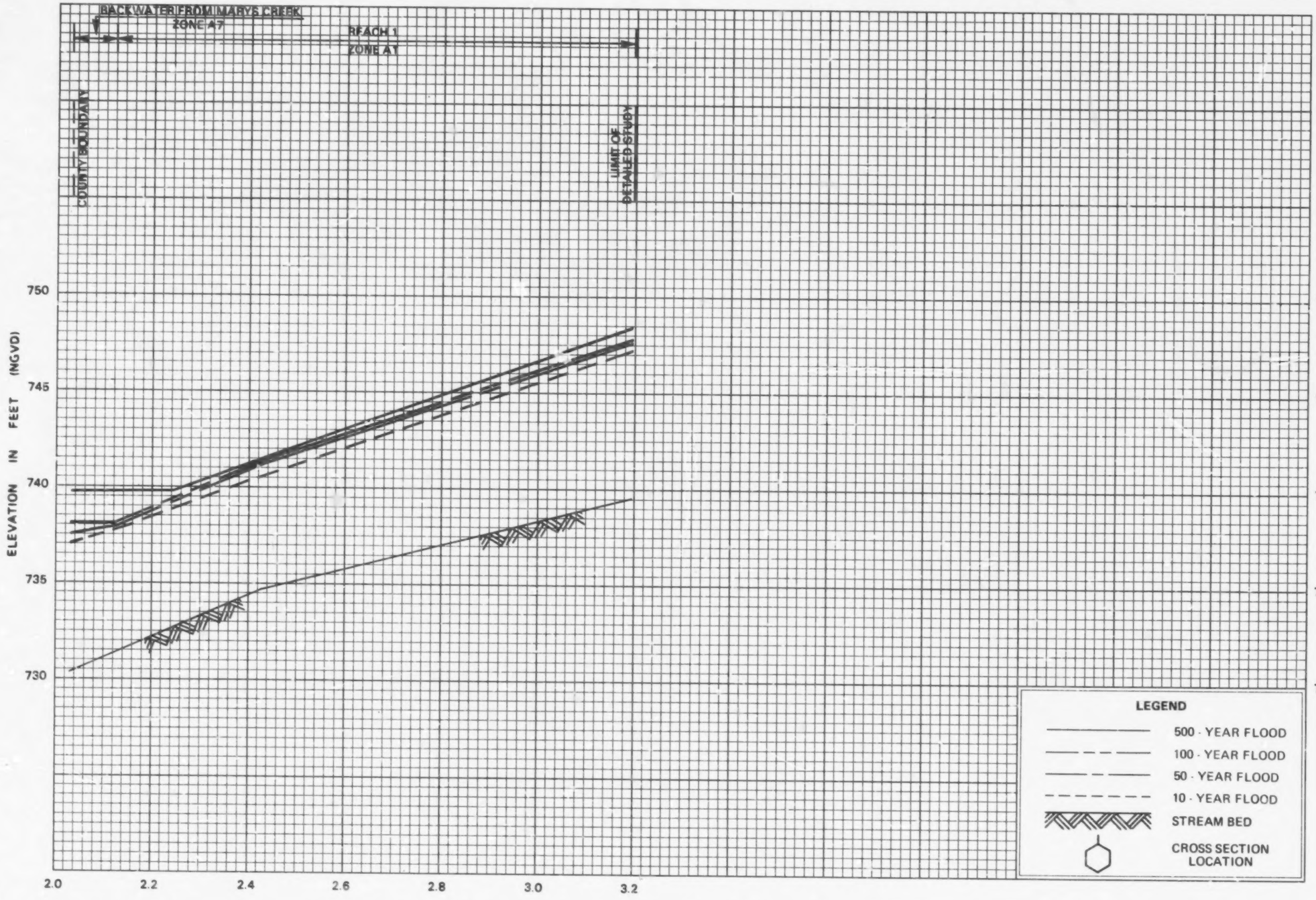
STREAM HEN-2A

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

41P

BEST COPY AVAILABLE



FLOOD PROFILES

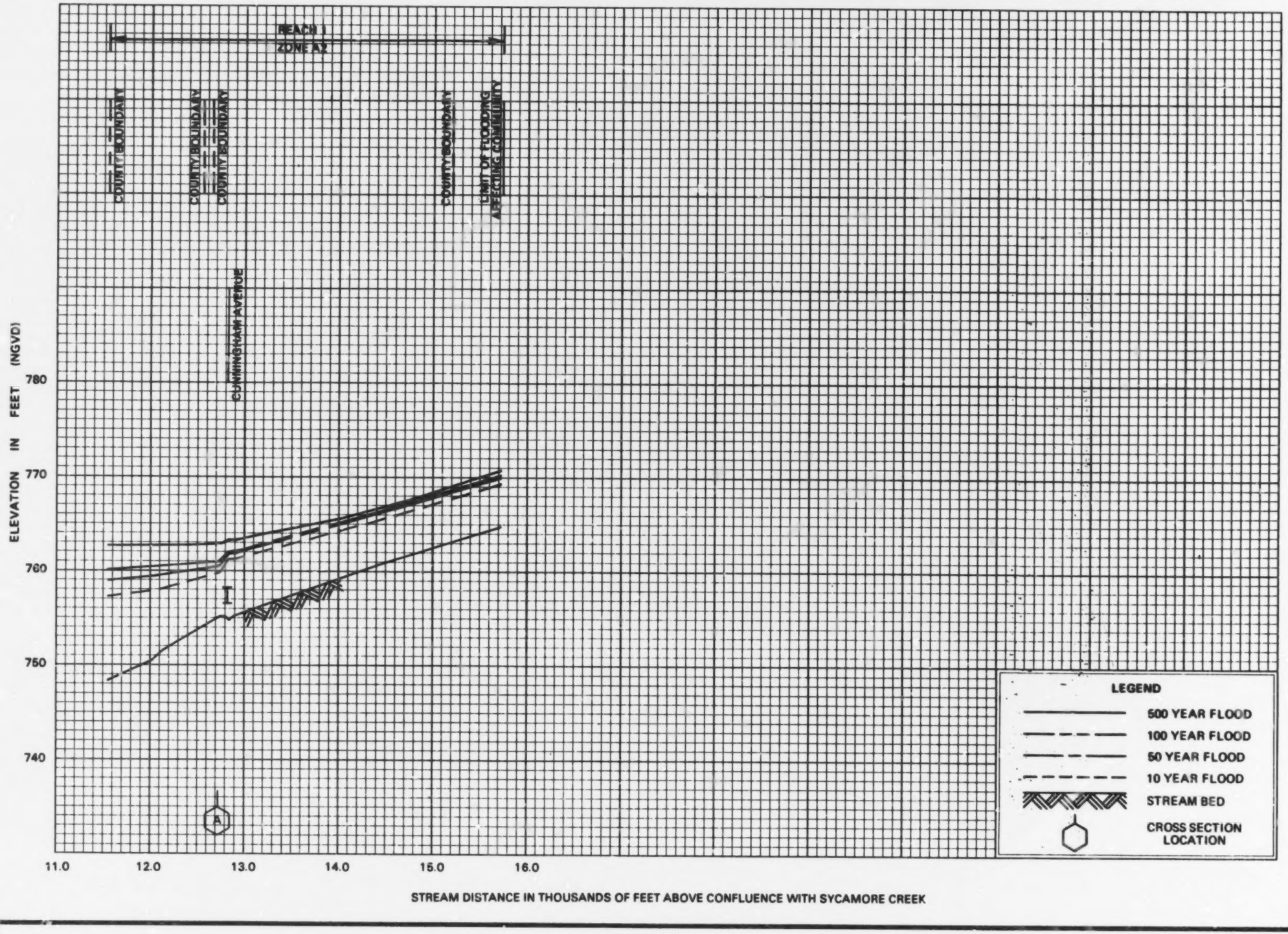
STREAM MSC-3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

42P

BEST COPY AVAILABLE



FLOOD PROFILES

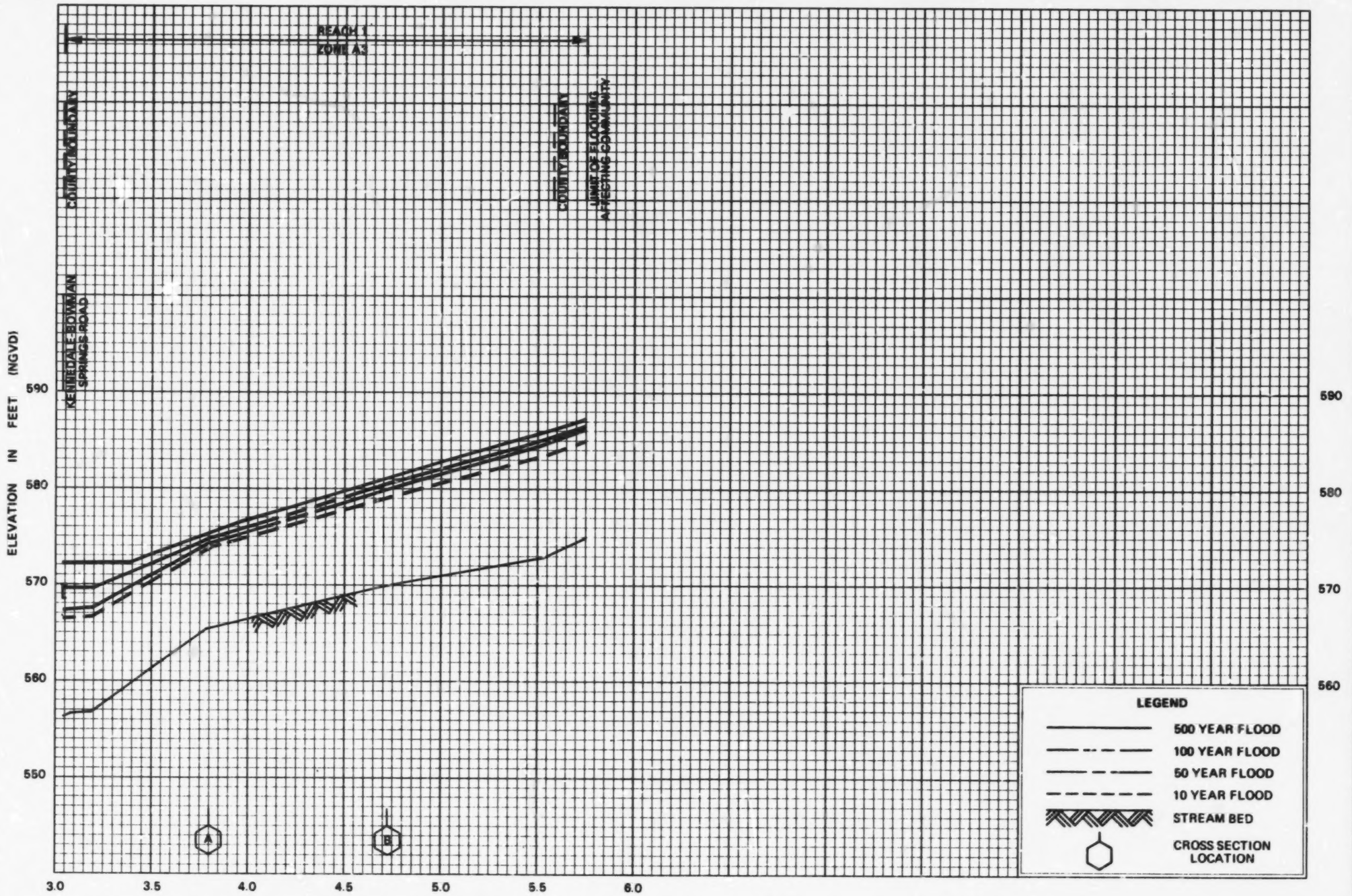
STREAM SC-7

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

43P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM VC-3

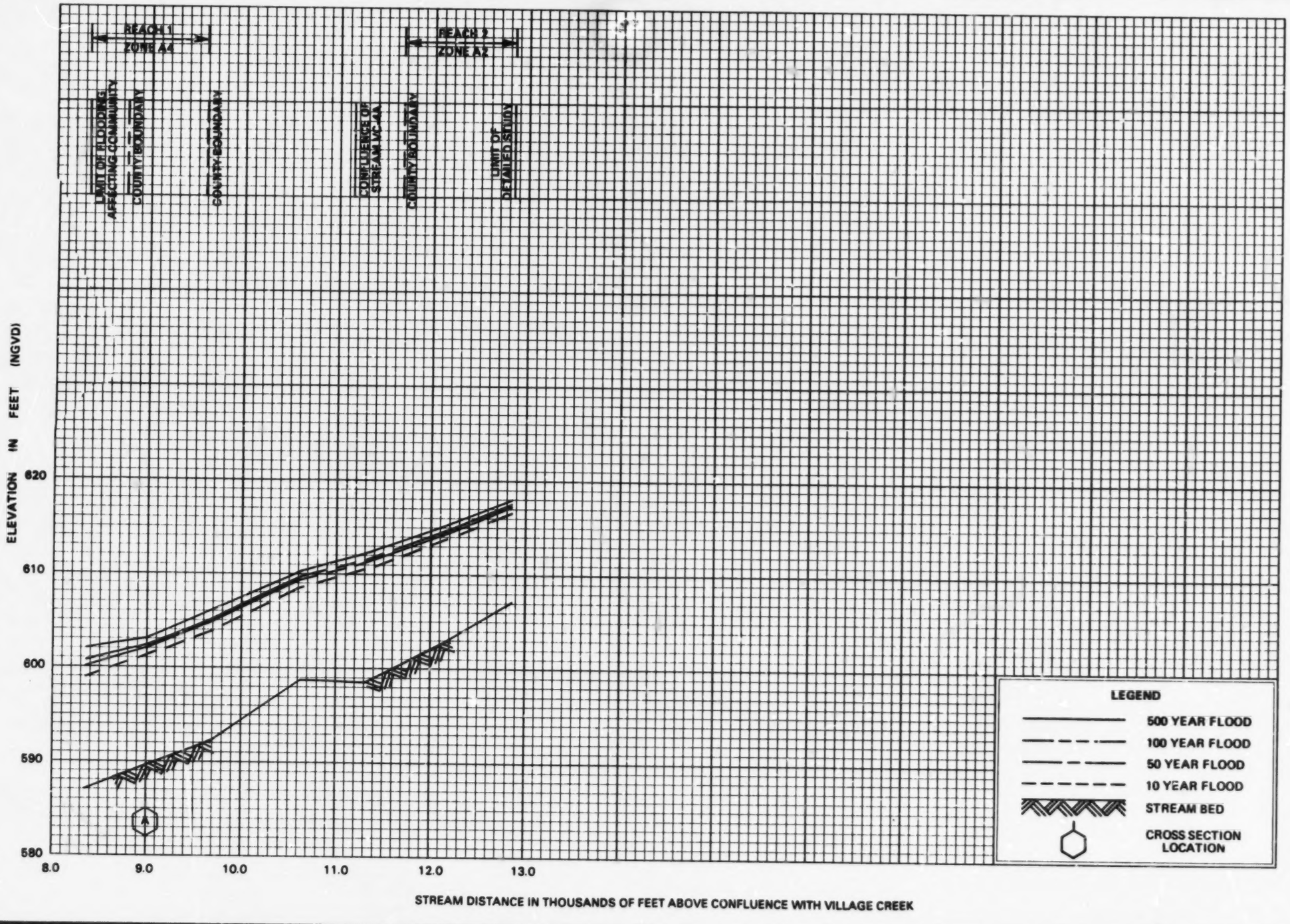
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

44P

GC

BEST COPY AVAILABLE



FLOOD PROFILES

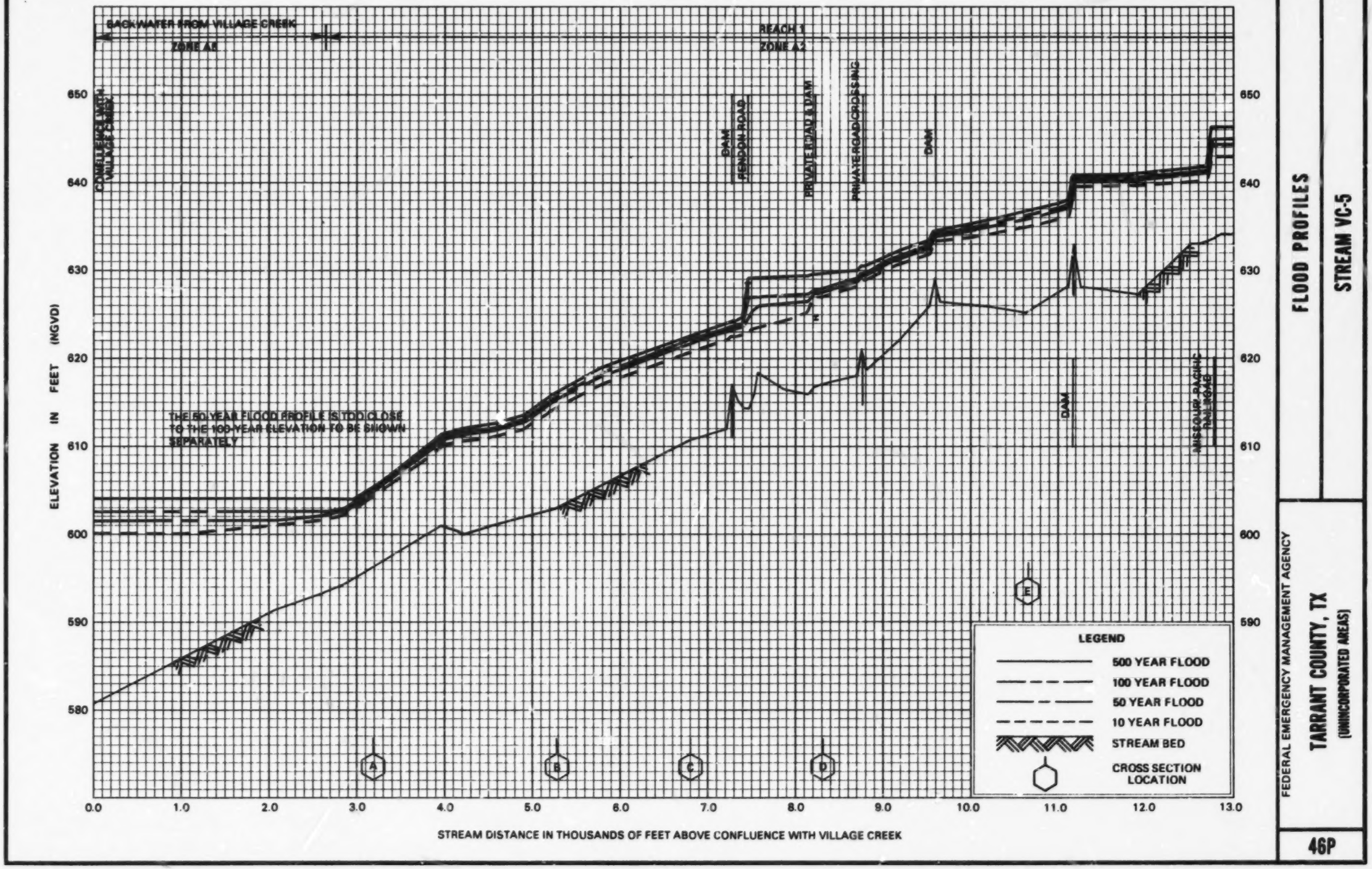
STREAM VC-4

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

45P

BEST COPY AVAILABLE



FLOOD PROFILES

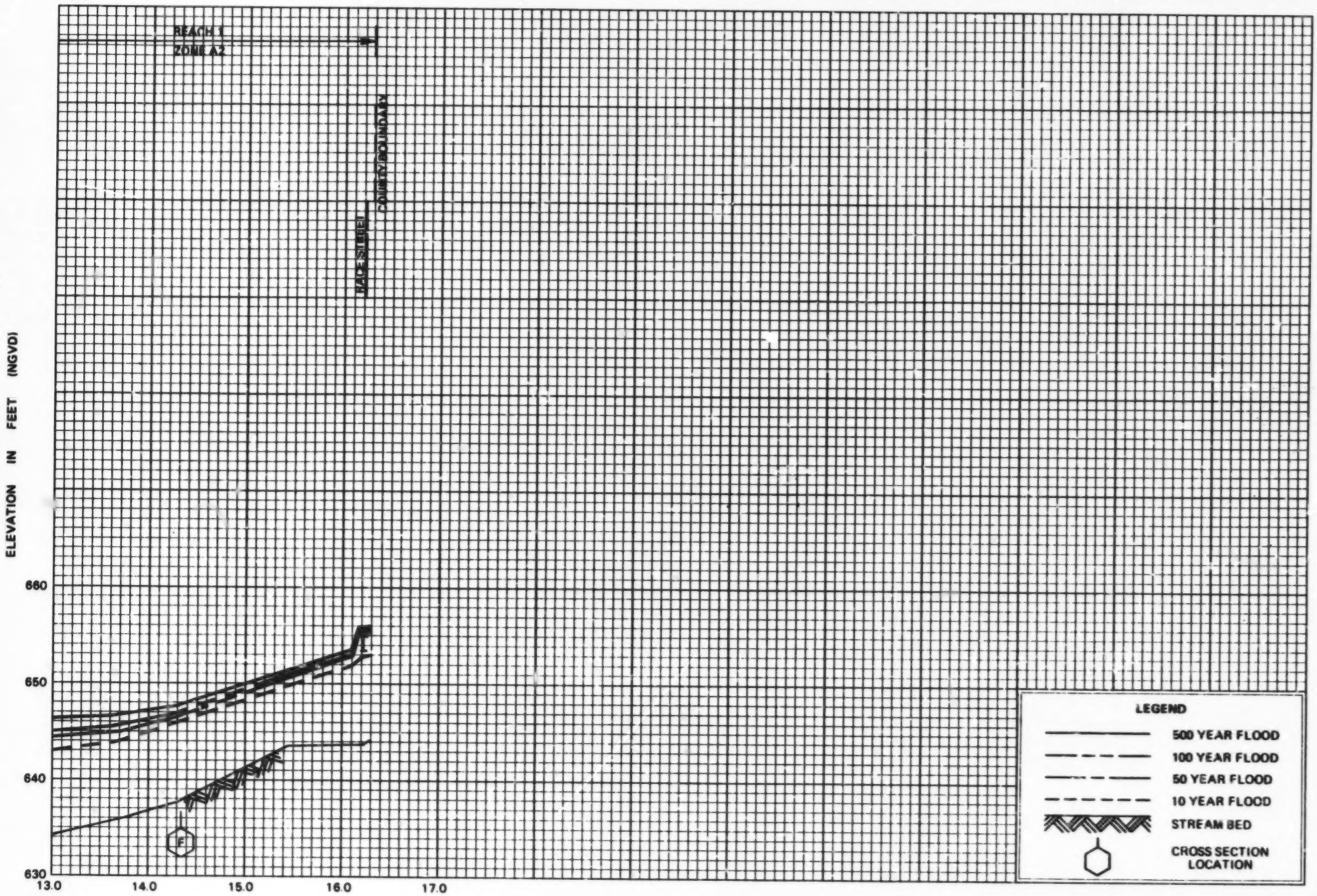
STREAM VC-5

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

46P

BEST COPY AVAILABLE



FLOOD PROFILES

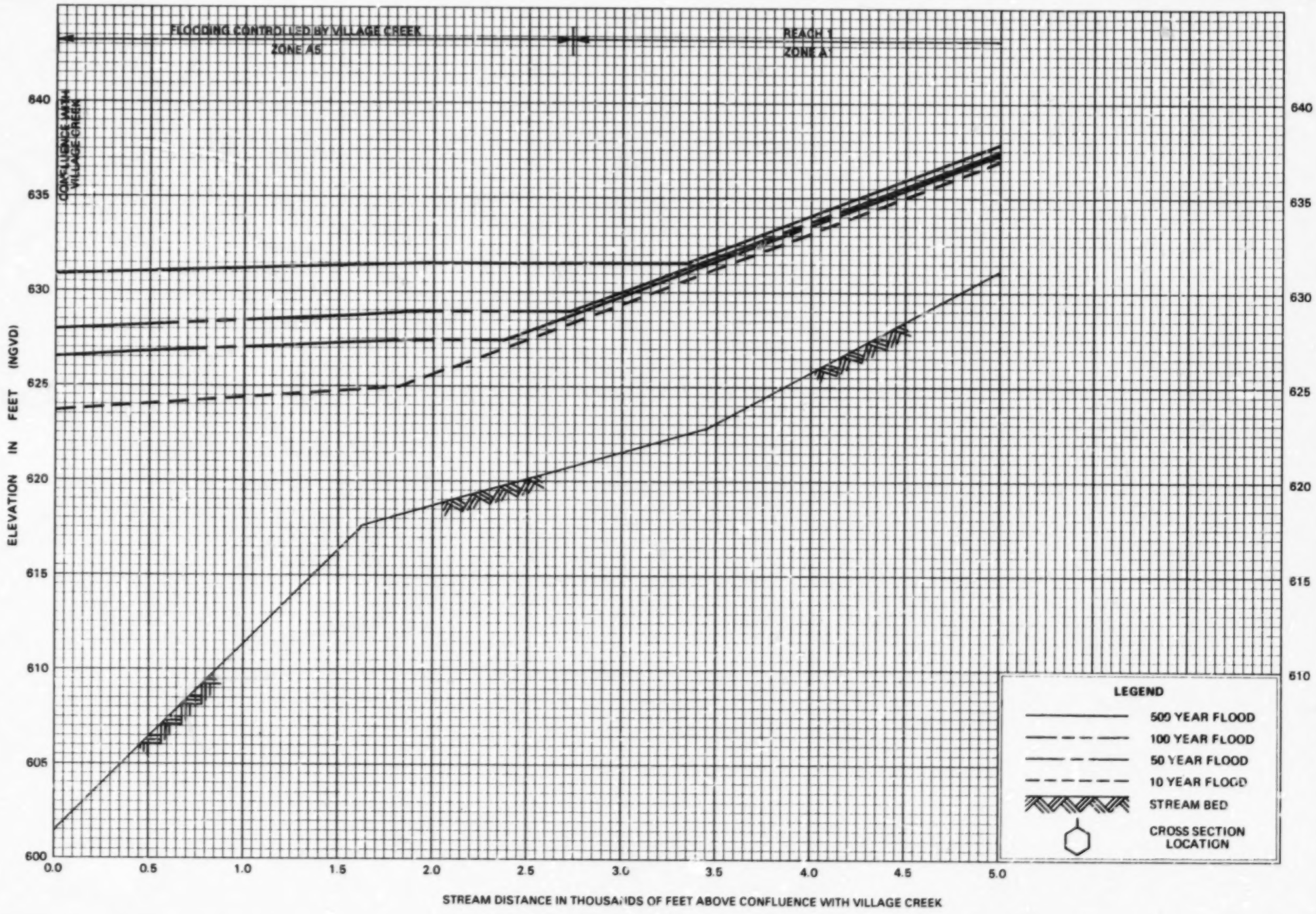
STREAM VC-5

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

47P

BEST COPY AVAILABLE



FLOOD PROFILES

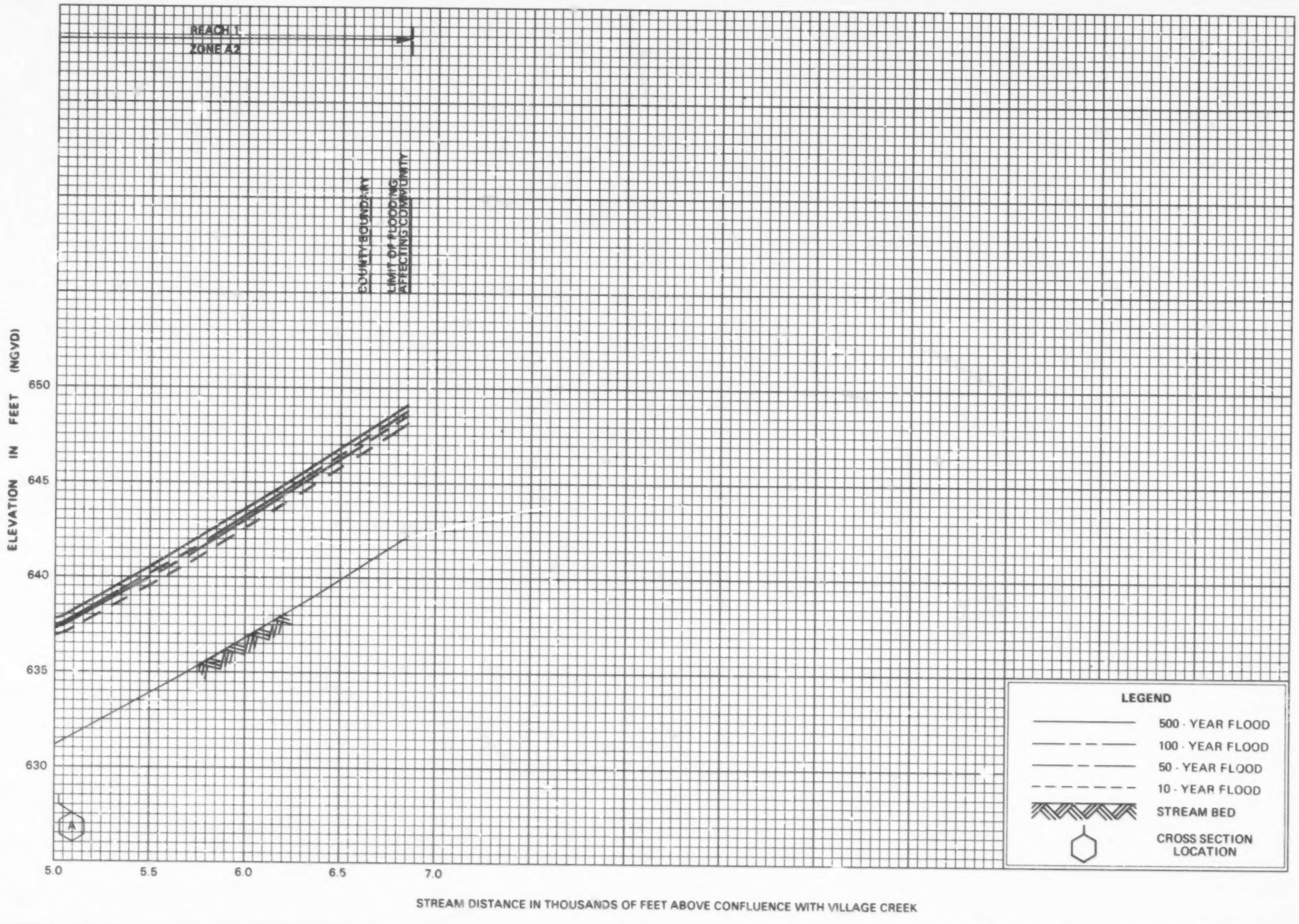
STREAM VC-6

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

48P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM VC-6

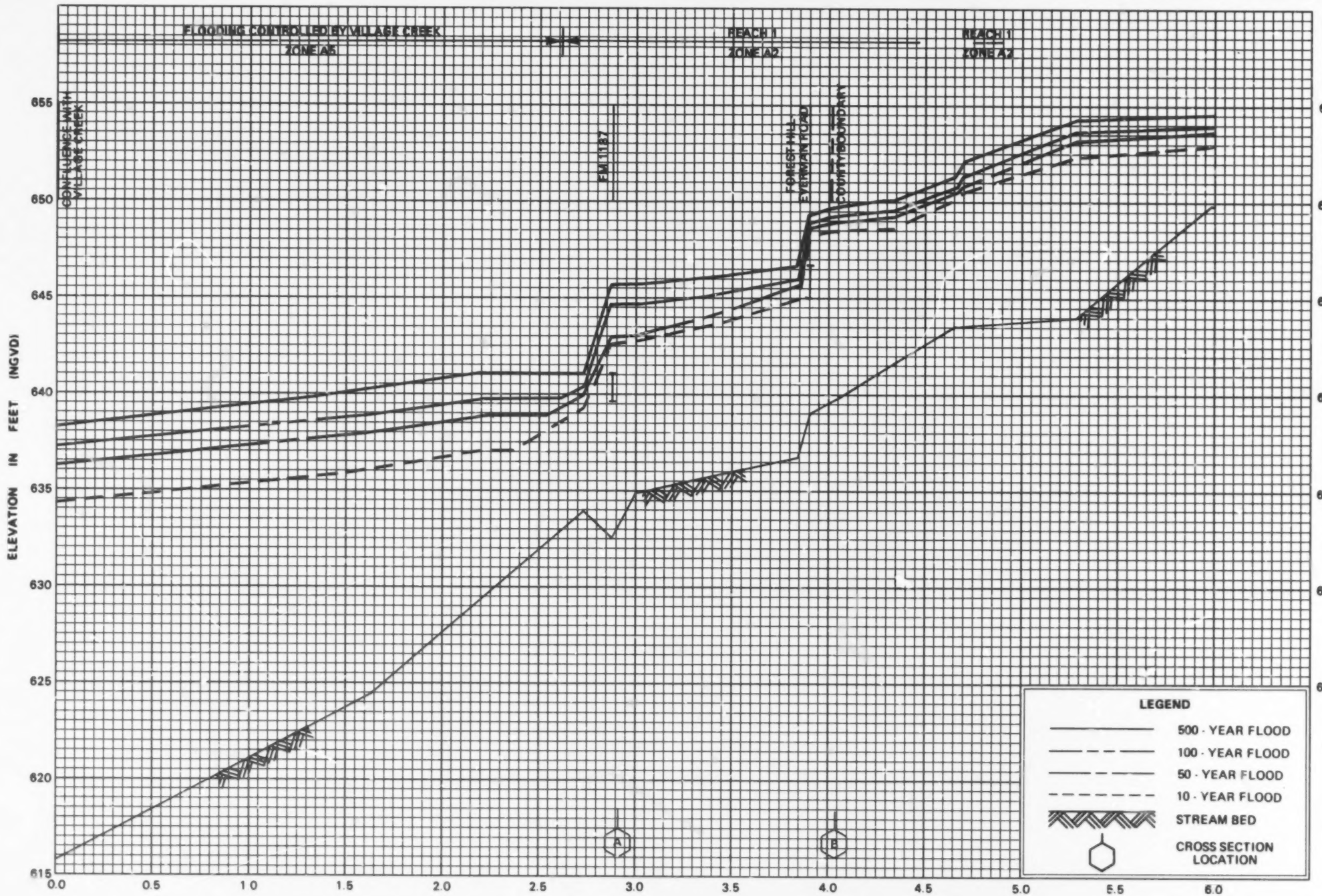
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

49P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM VC-7

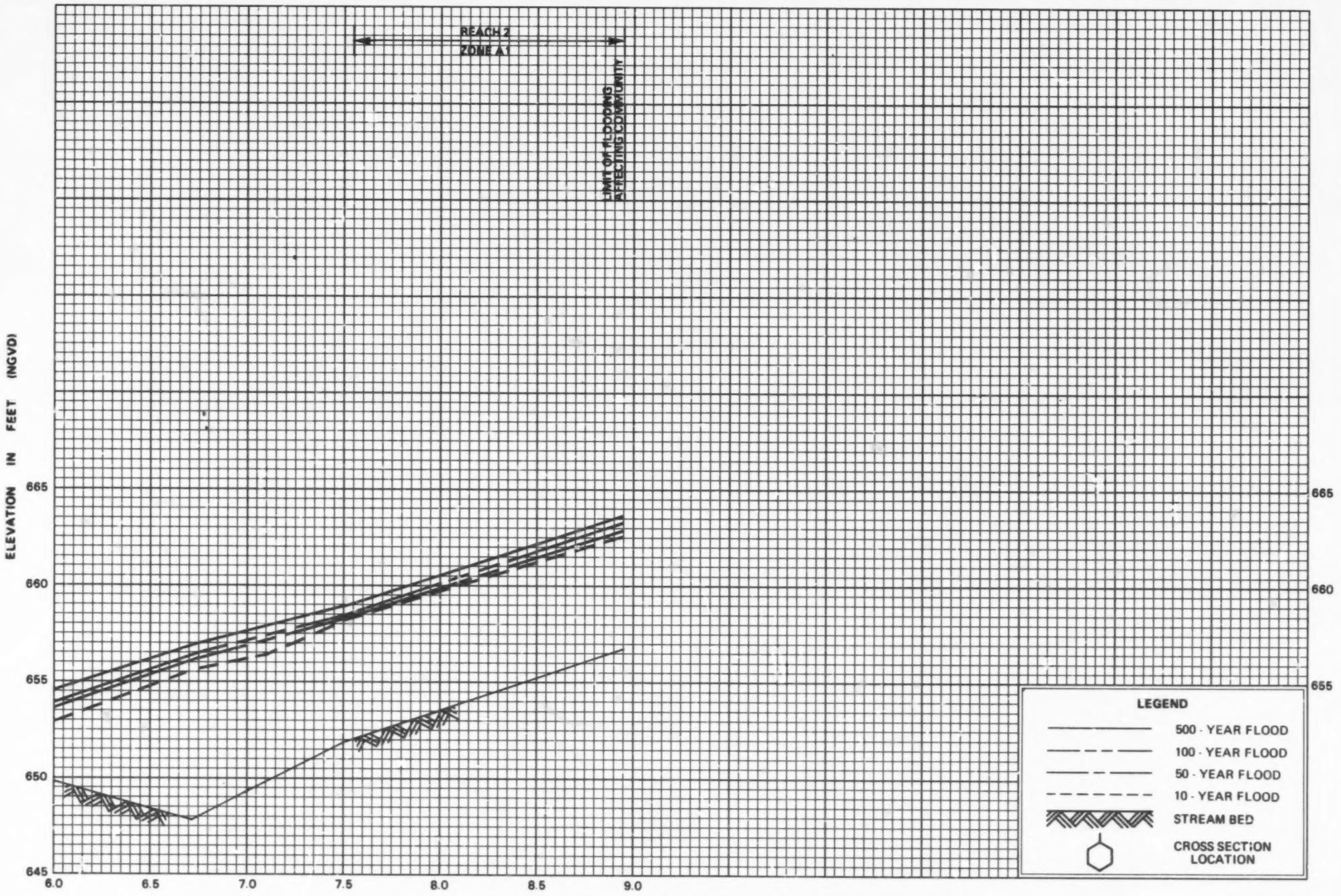
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

50P

BEST COPY AVAILABLE



FLOOD PROFILES

STREAM VC-7

FEDERAL EMERGENCY MANAGEMENT AGENCY

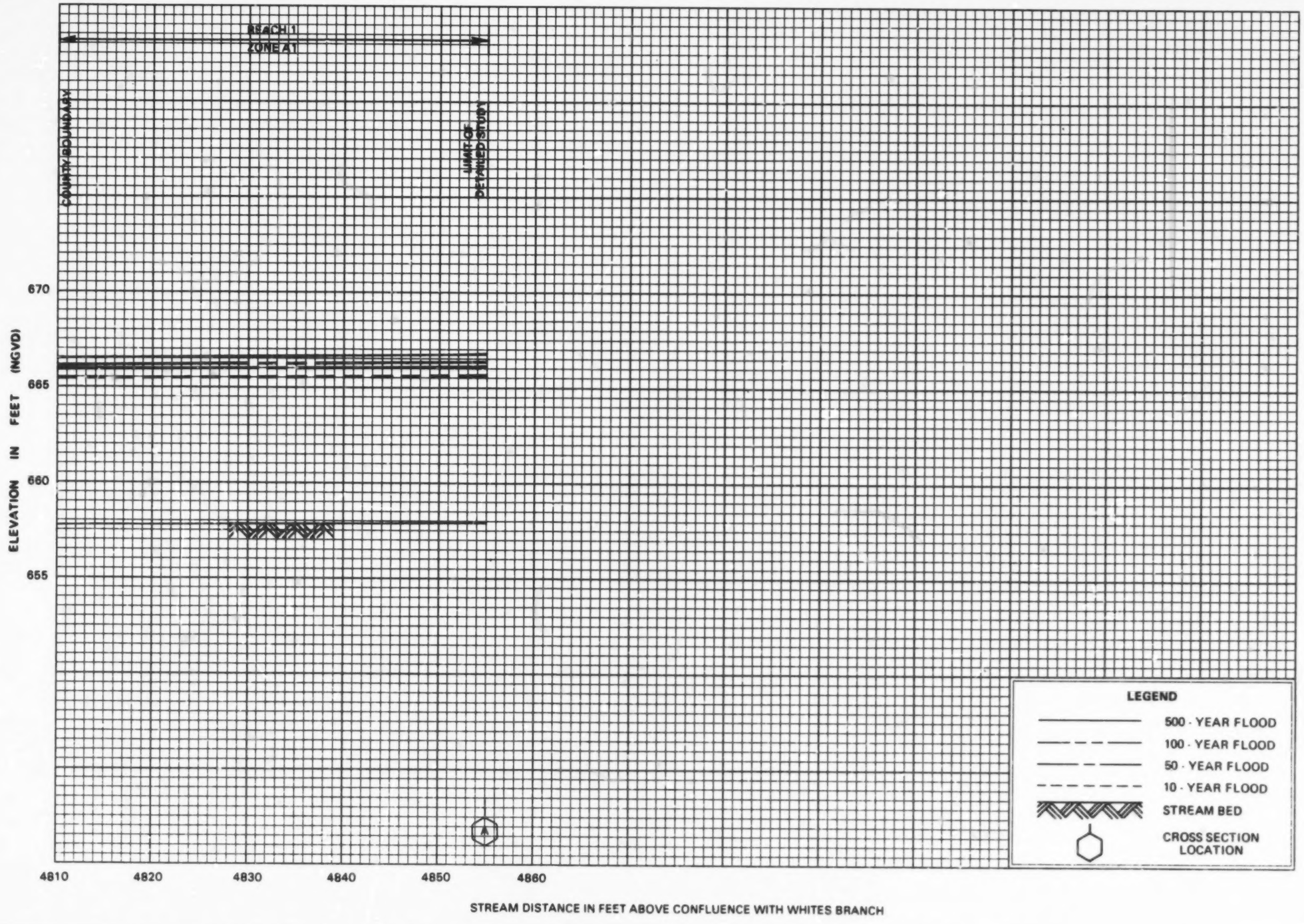
TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

51P

97

BEST COPY AVAILABLE



FLOOD PROFILES

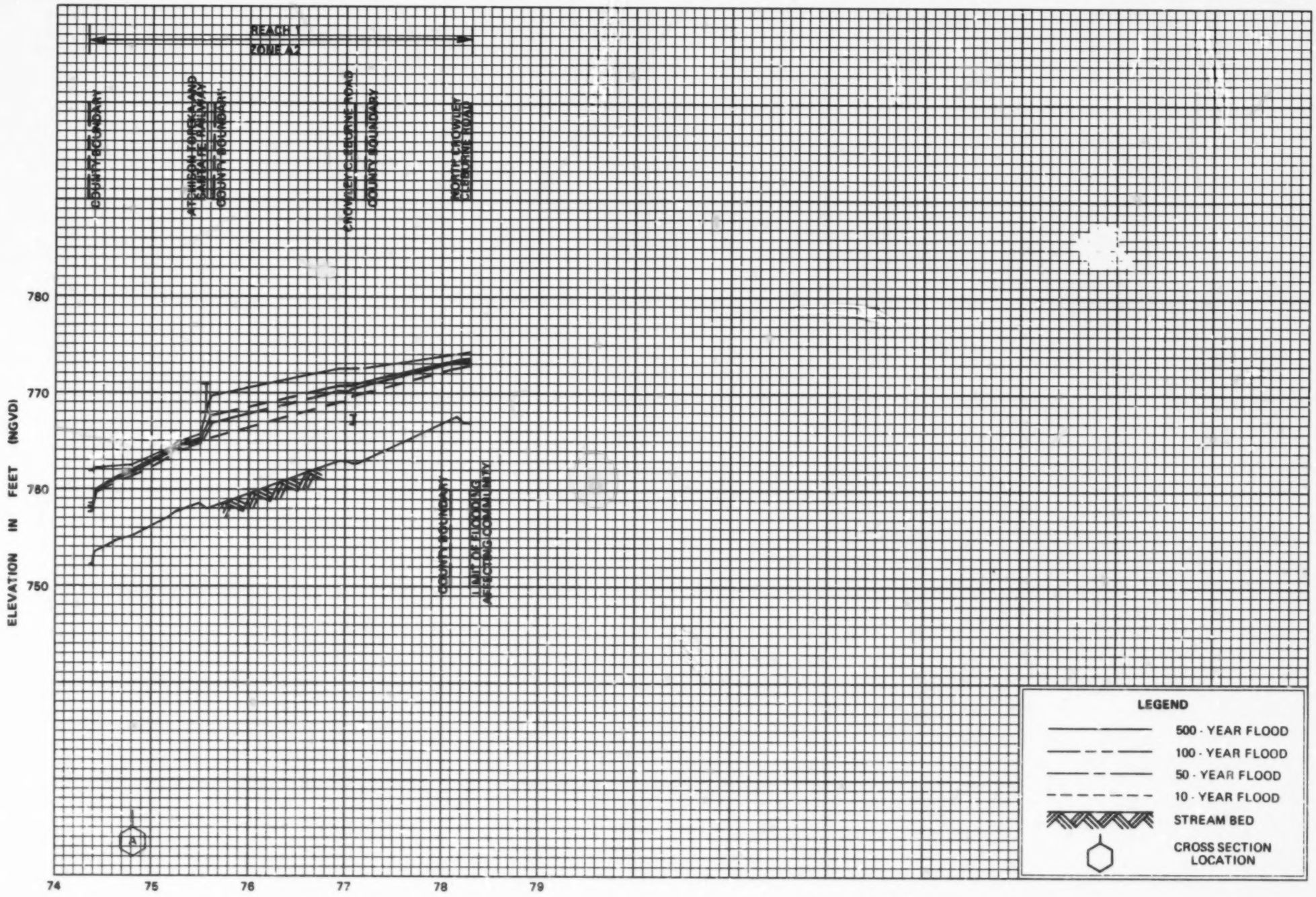
STREAM WB-1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

52P

BEST COPY AVAILABLE



FLOOD PROFILES

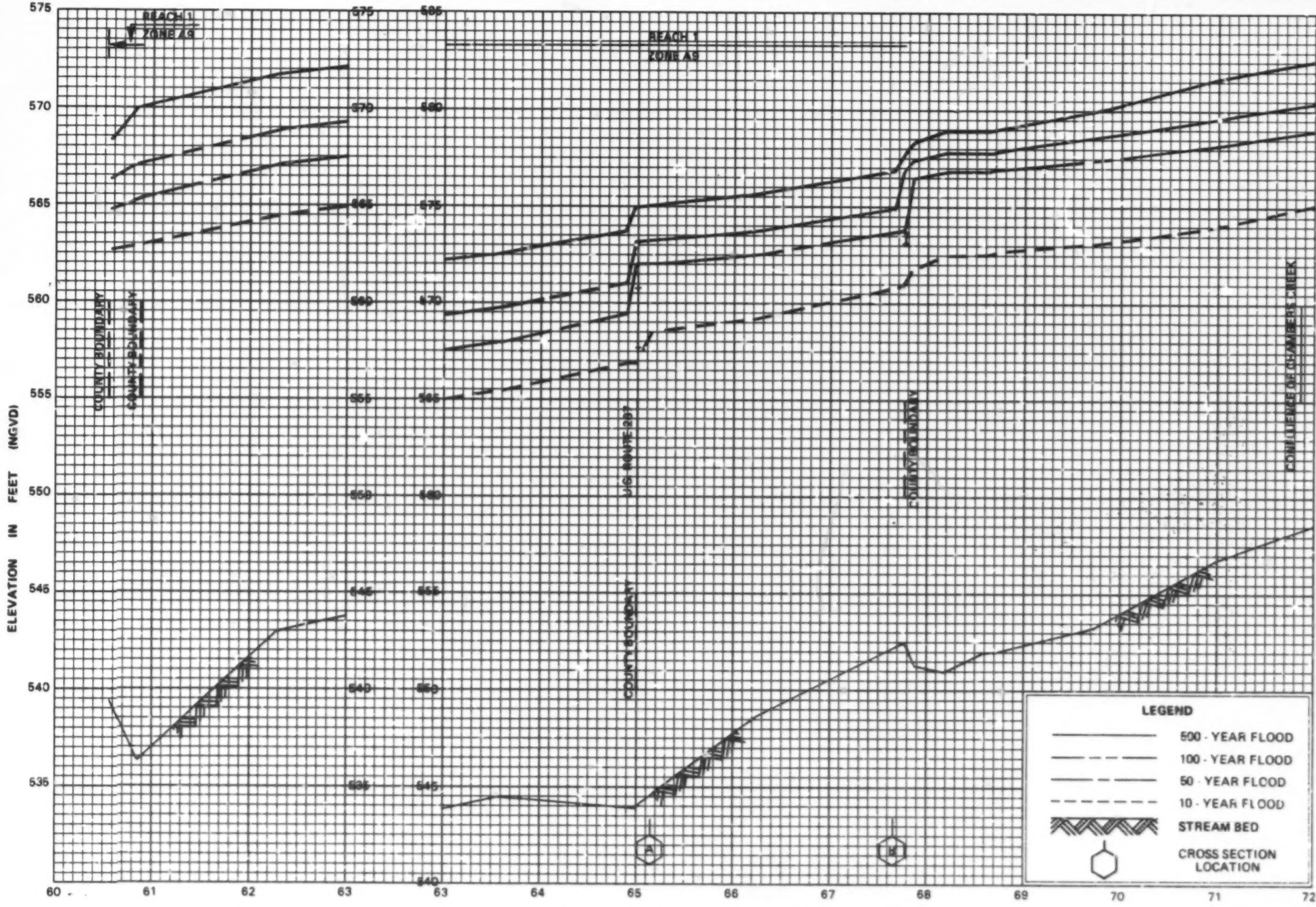
SYCAMORE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

53P

BEST COPY AVAILABLE



FLOOD PROFILES

VILLAGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

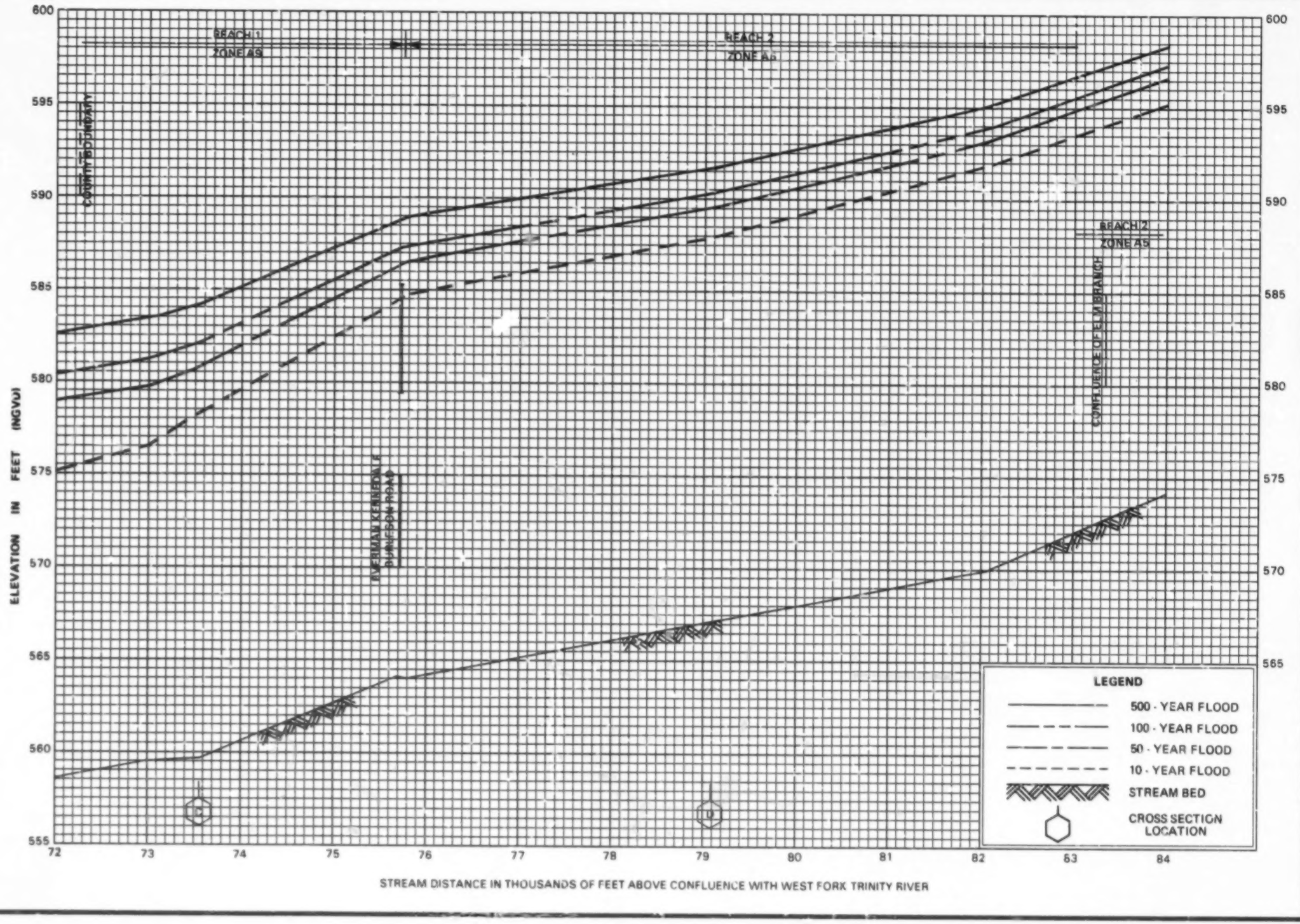
TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

54P

100

BEST COPY AVAILABLE



FLOOD PROFILES

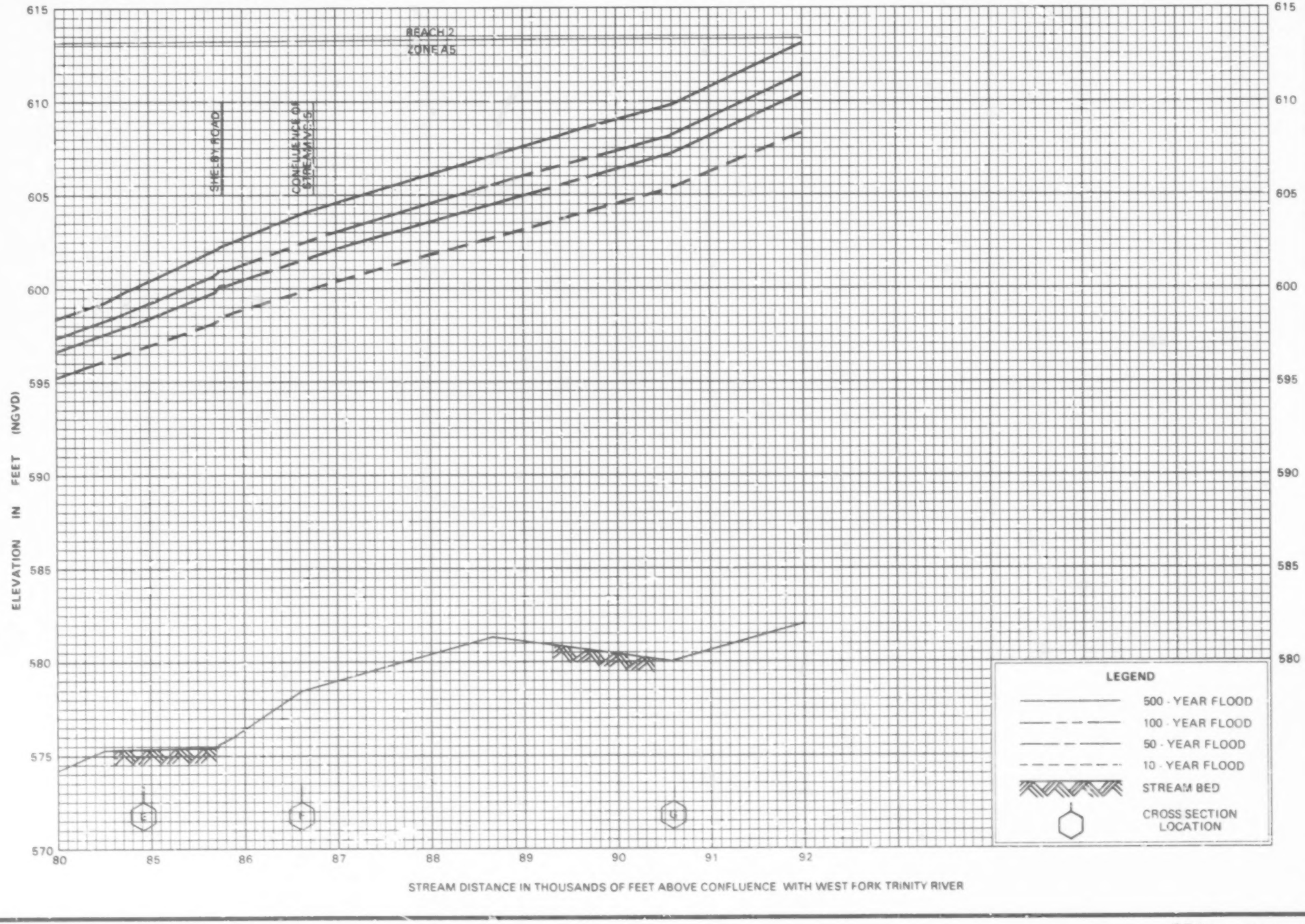
VILLAGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

55P

BEST COPY AVAILABLE



FLOOD PROFILES

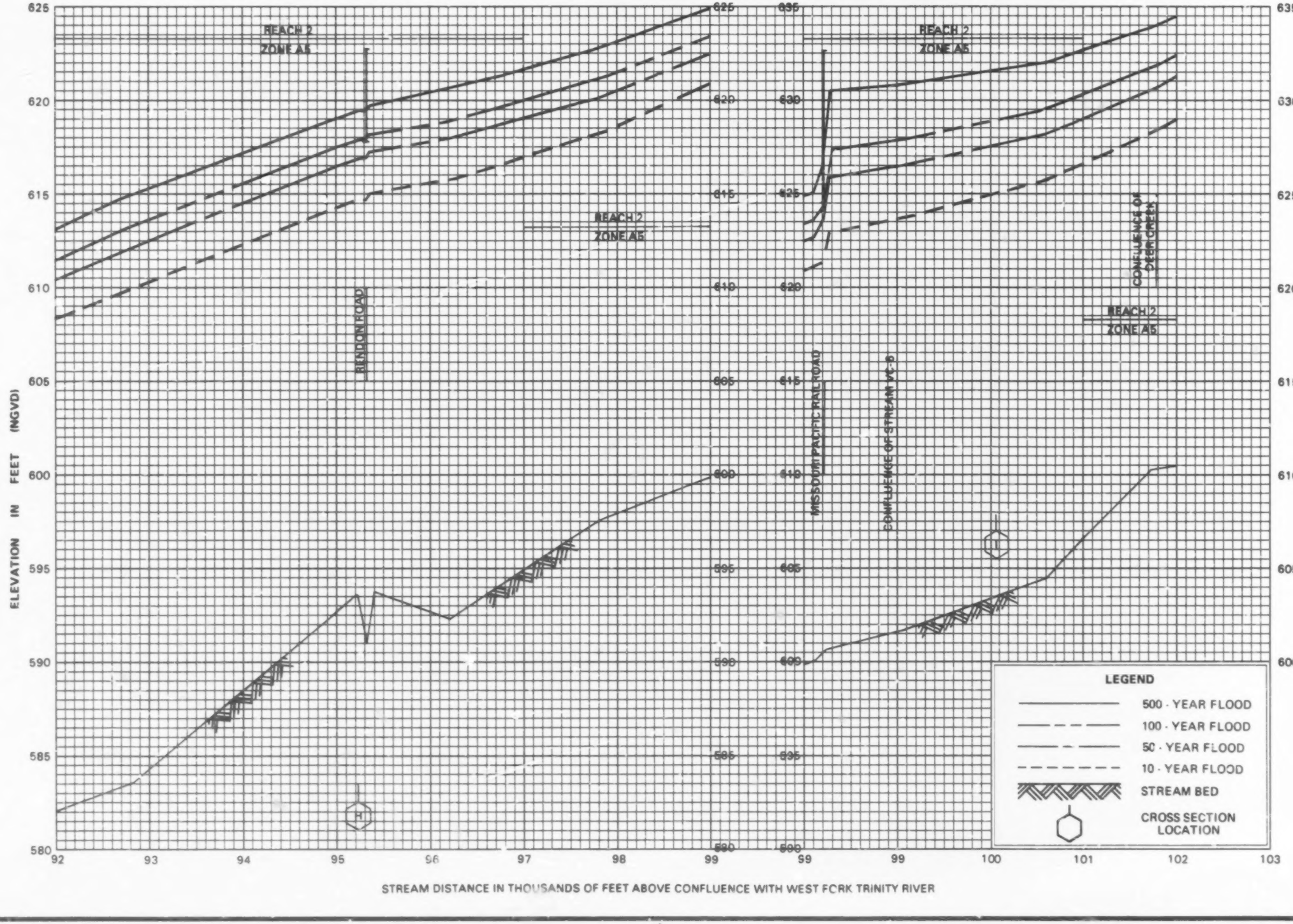
VILLAGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

56P

BEST COPY AVAILABLE



FLOOD PROFILES

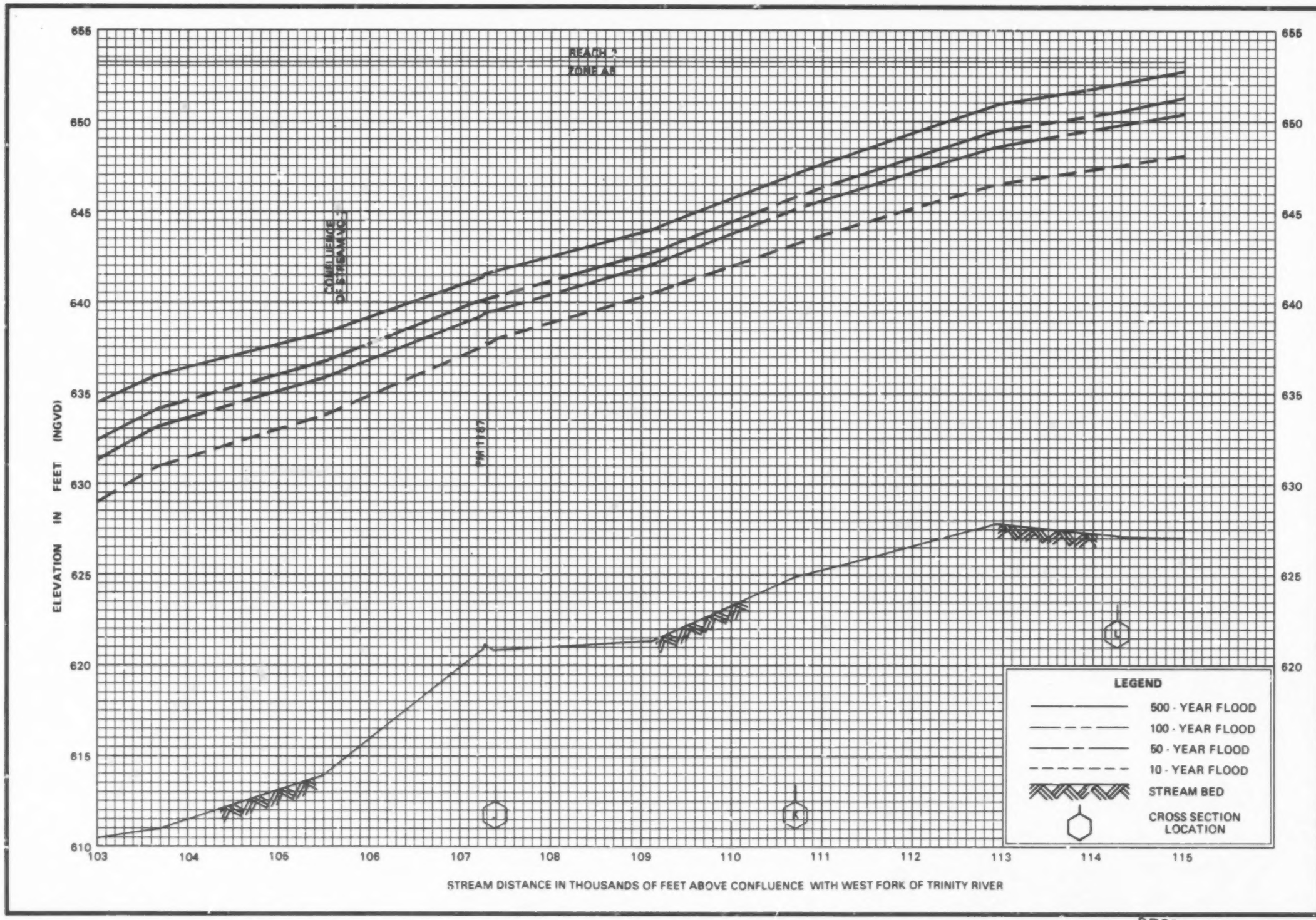
VILLAGE CREEK

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

57P

BEST COPY AVAILABLE



FLOOD PROFILES

VILLAGE CREEK

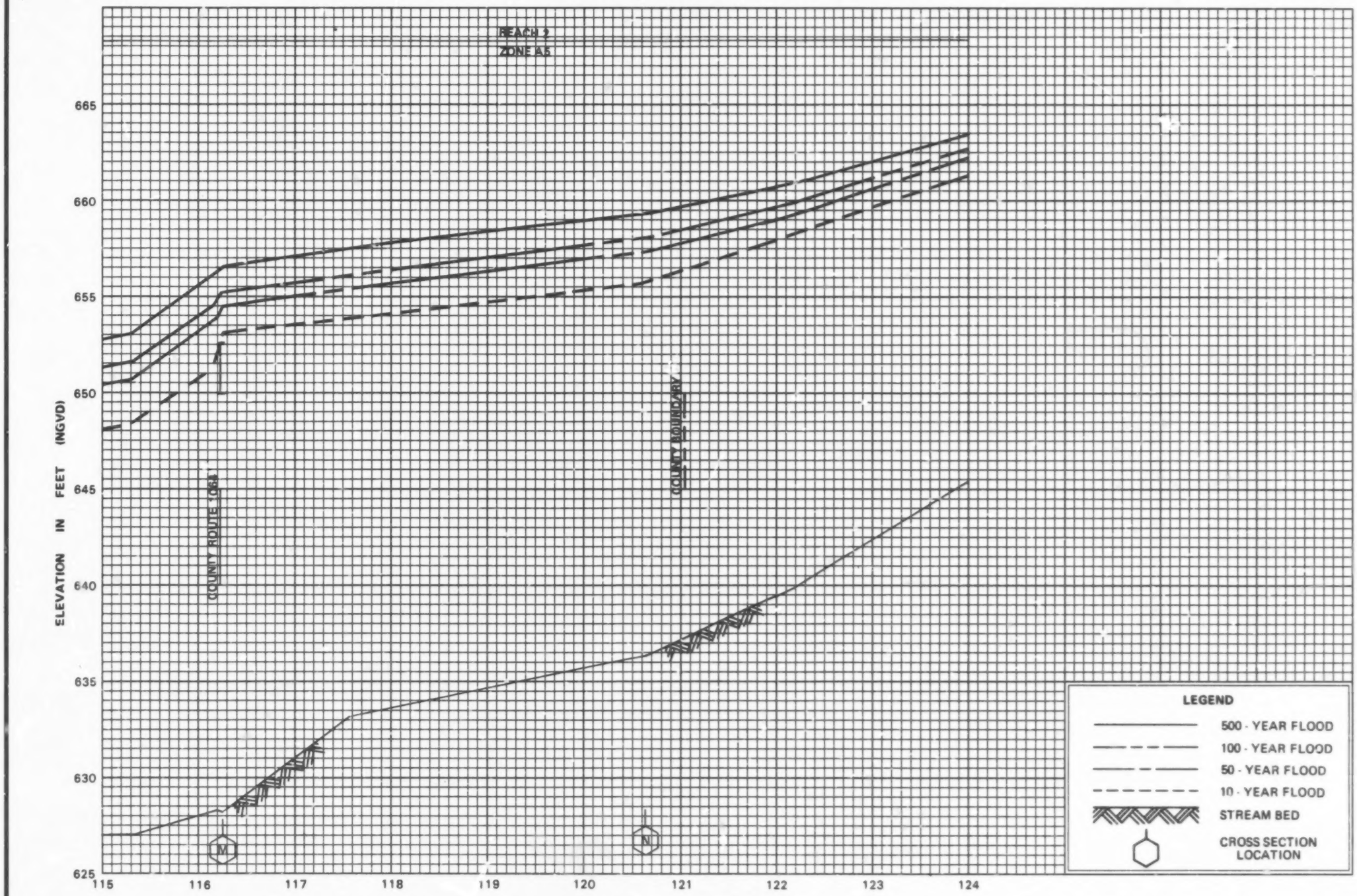
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

58P

104

BEST COPY AVAILABLE



FLOOD PROFILES

VILLAGE CREEK

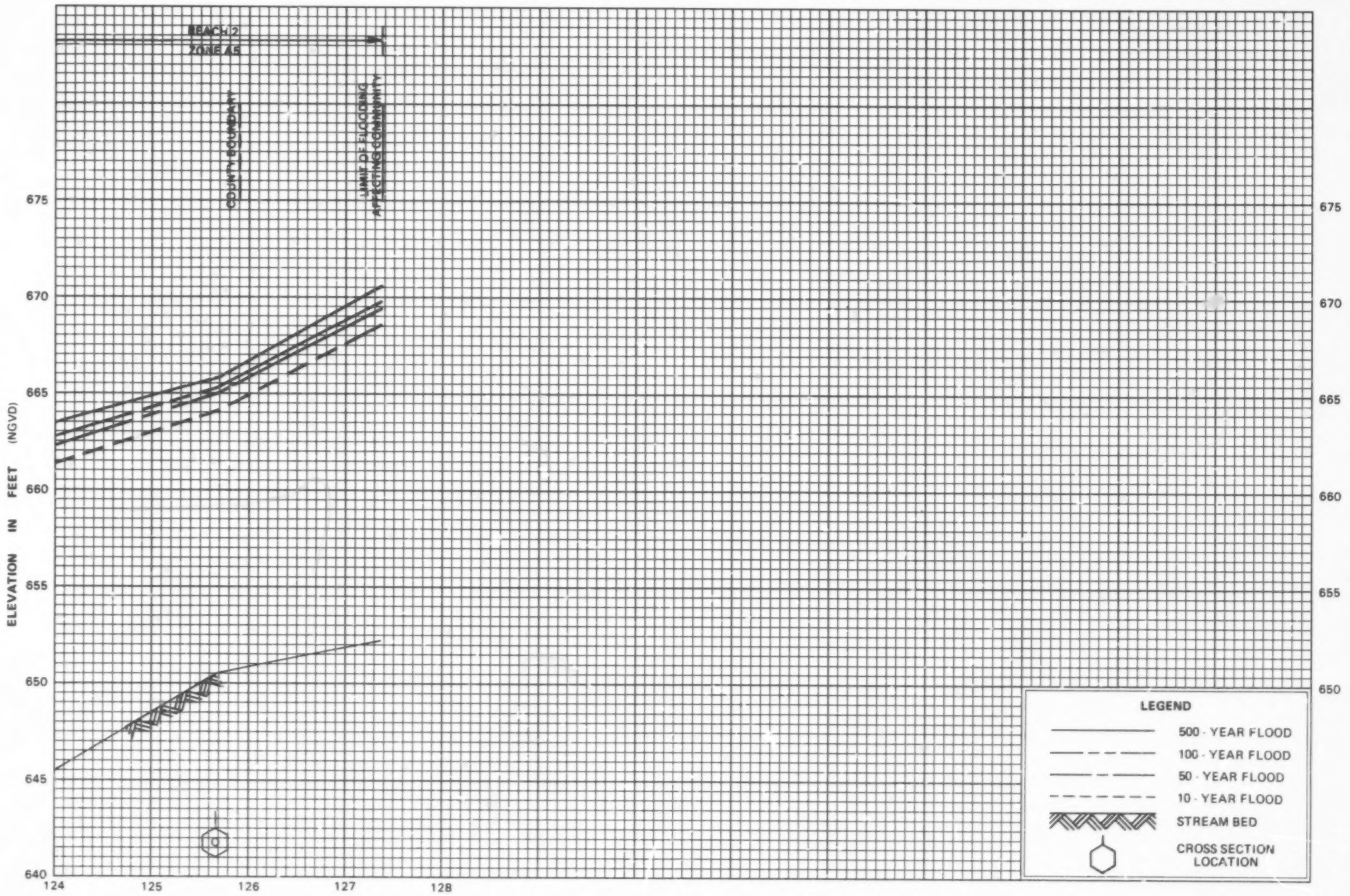
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

59P

BEST COPY AVAILABLE



FLOOD PROFILES

VILLAGE CREEK

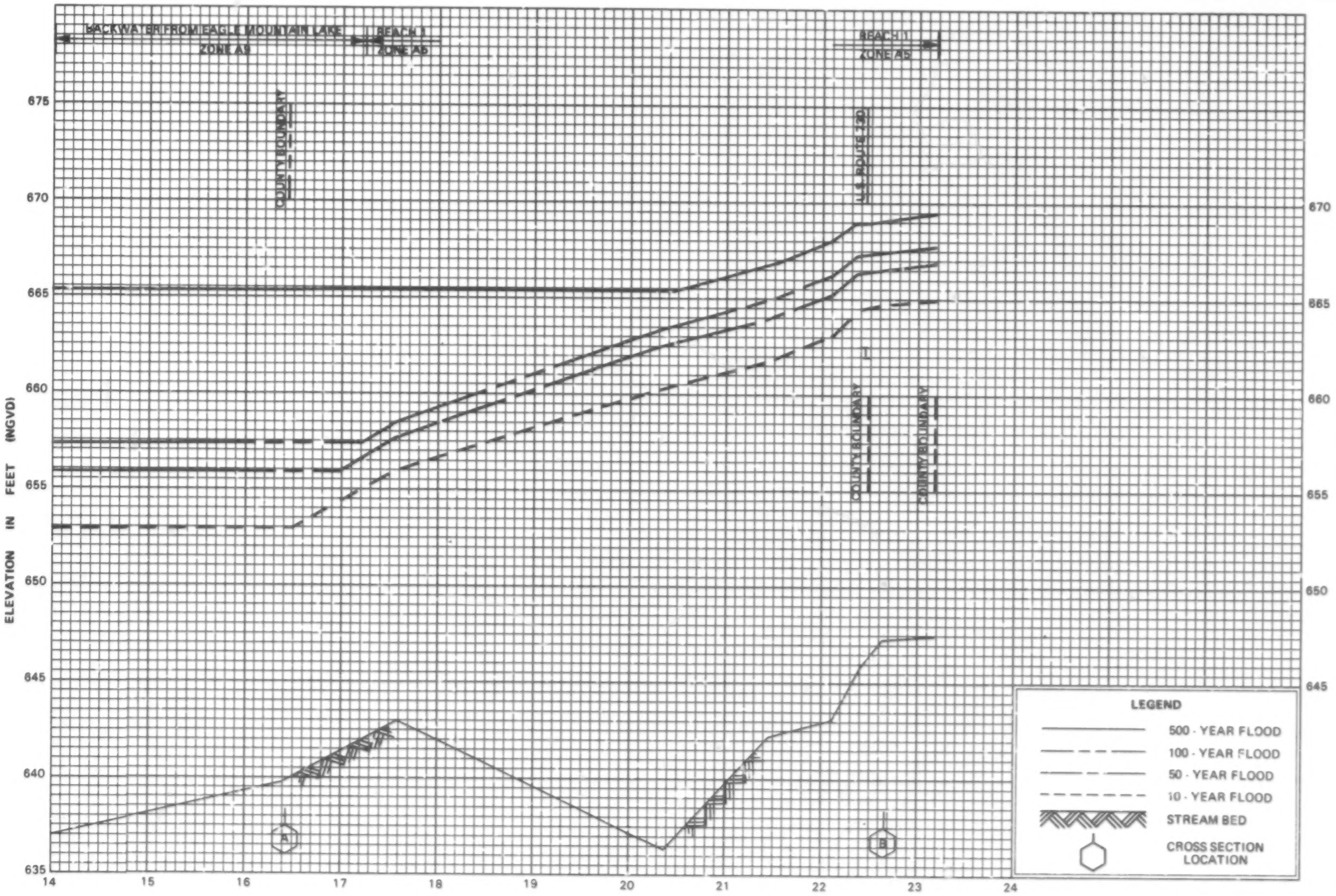
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

60P

BES. COPY AVAILABLE



FLOOD PROFILES

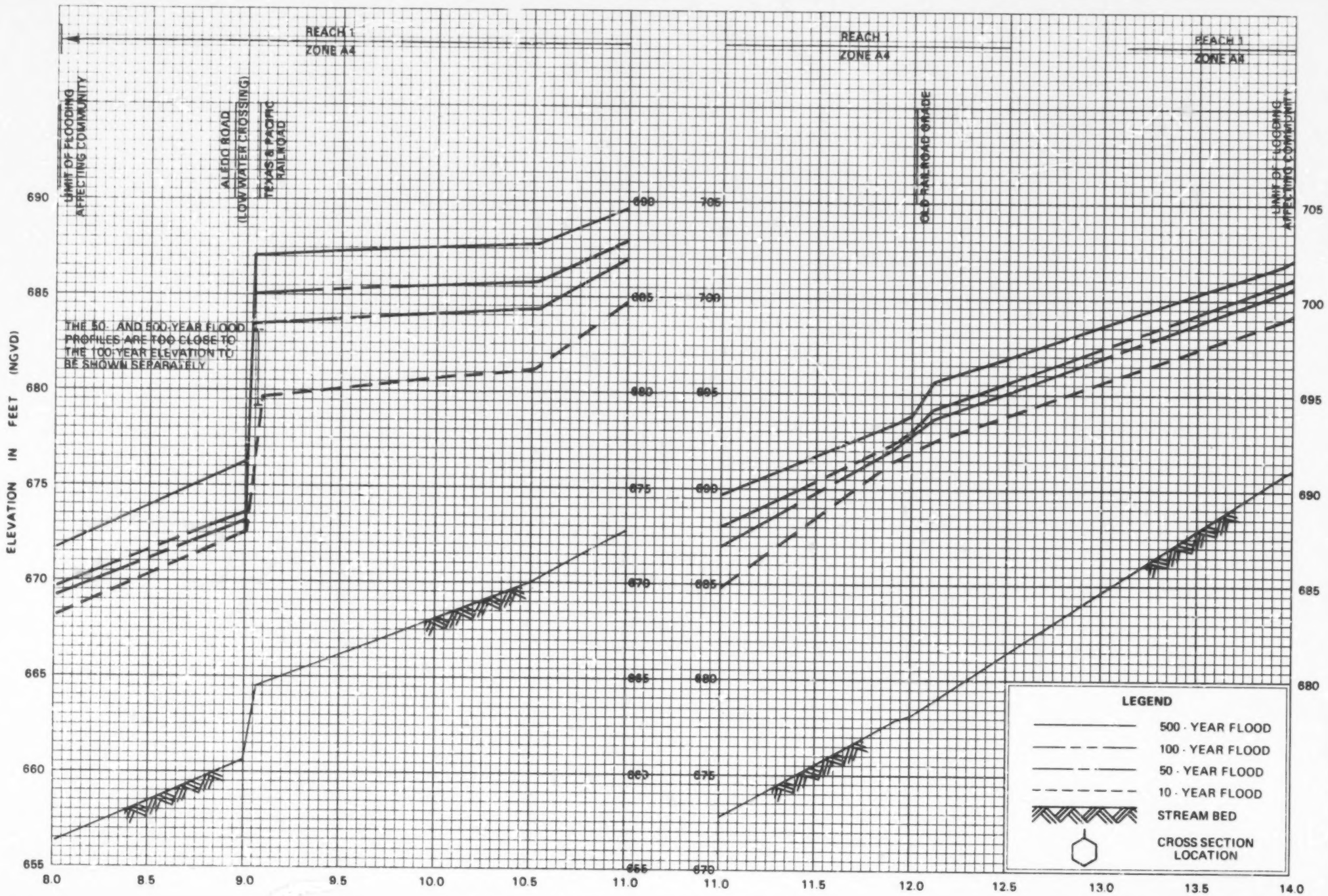
WALNUT CREEK 1

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

61P

BEST COPY AVAILABLE



FLOOD PROFILES

WALNUT CREEK 2

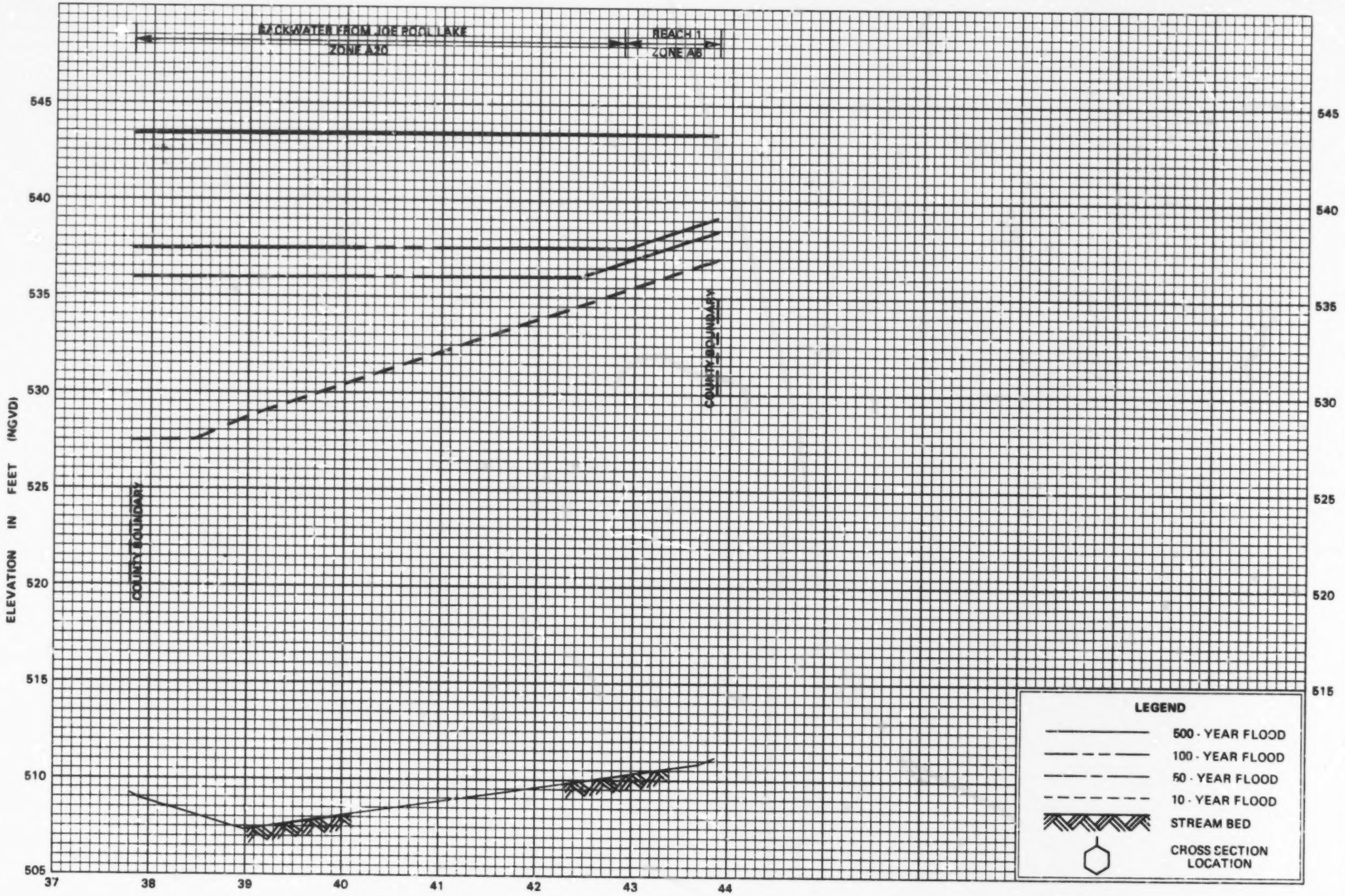
FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

62P

108

BEST COPY AVAILABLE



FLOOD PROFILES

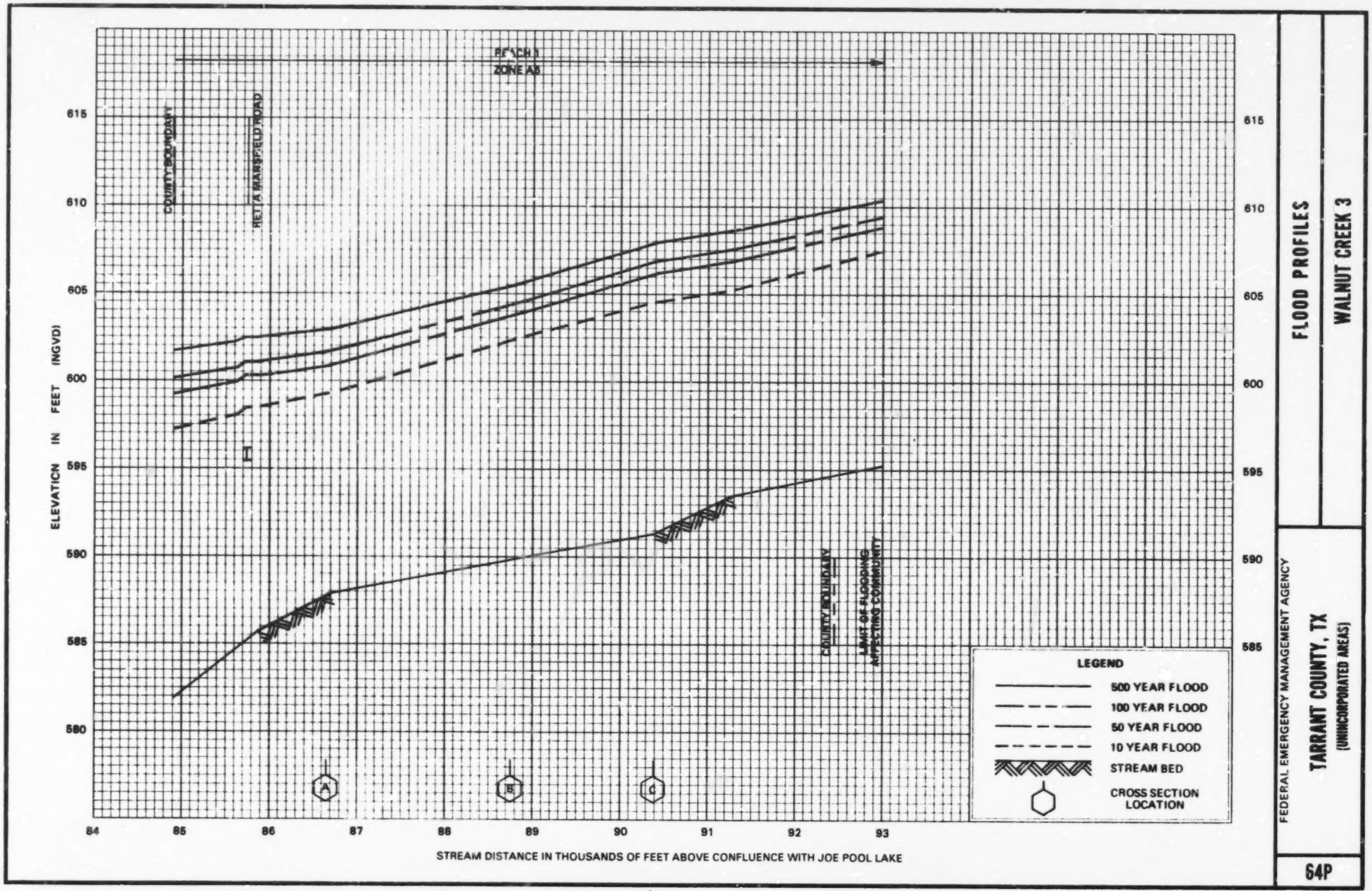
WALNUT CREEK 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

63P

BEST COPY AVAILABLE



FLOOD PROFILES

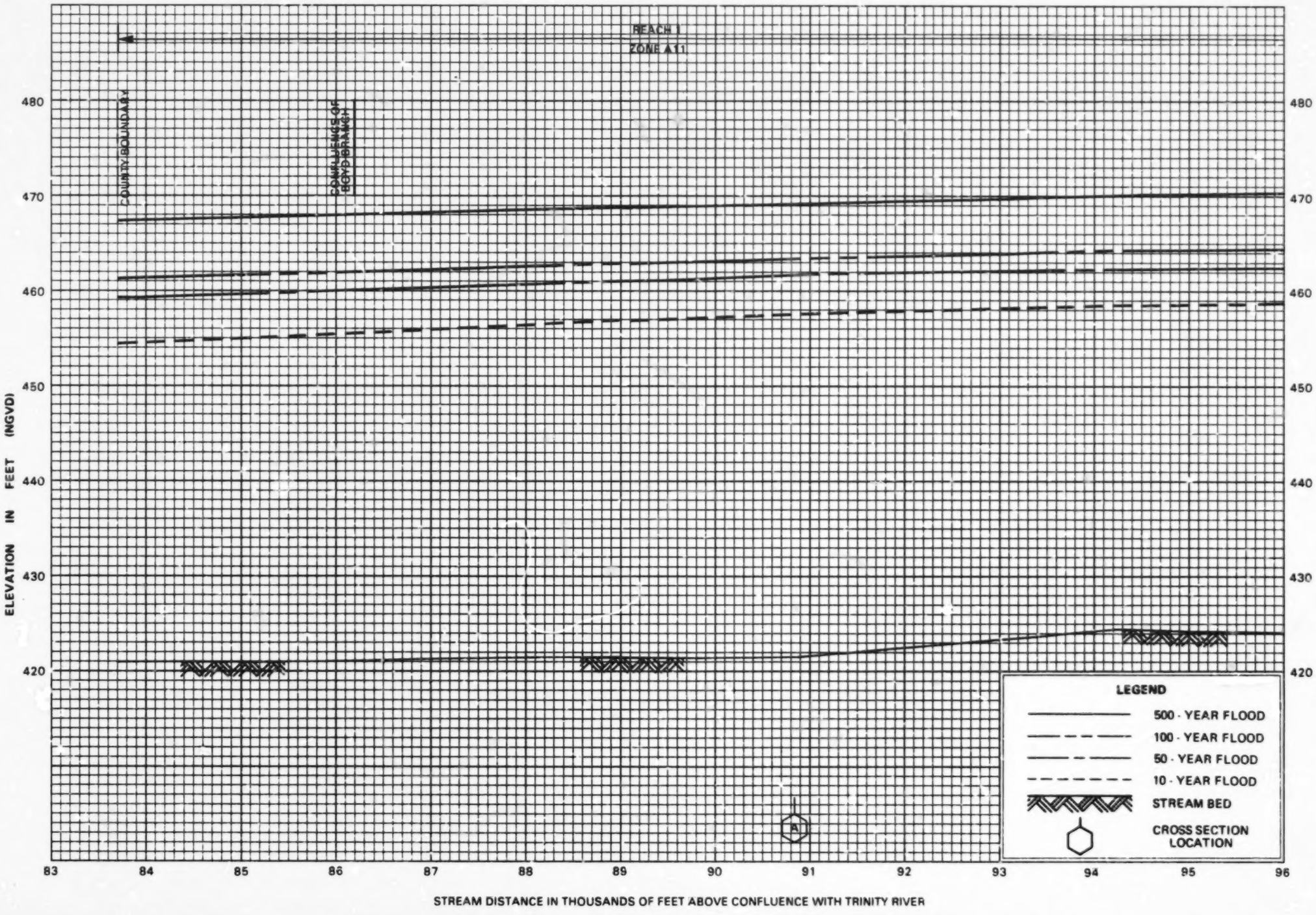
WALNUT CREEK 3

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

64P

BEST COPY AVAILABLE



FLOOD PROFILES

WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

65P

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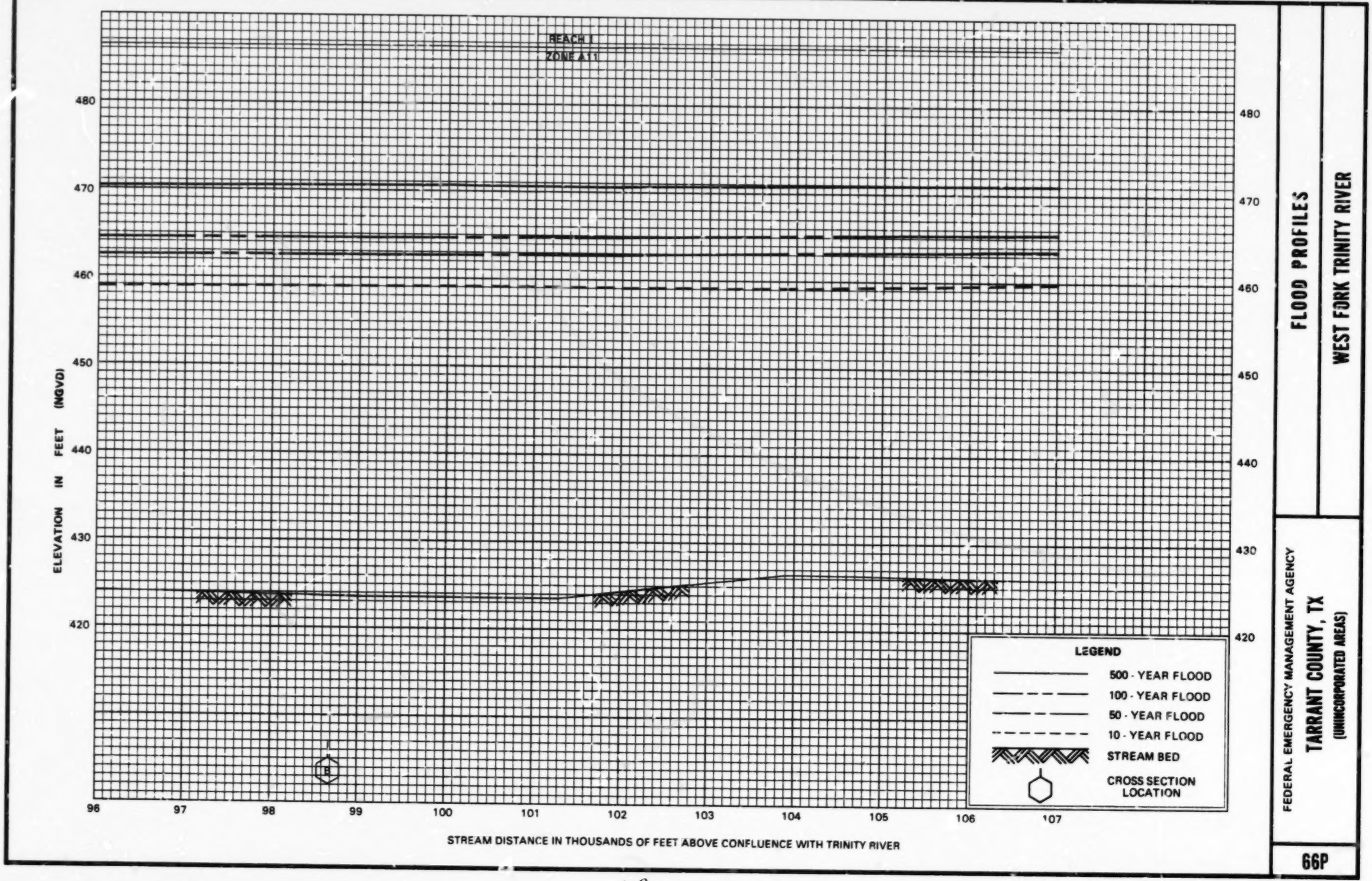
BEST COPY AVAILABLE



FLOOD PROFILES

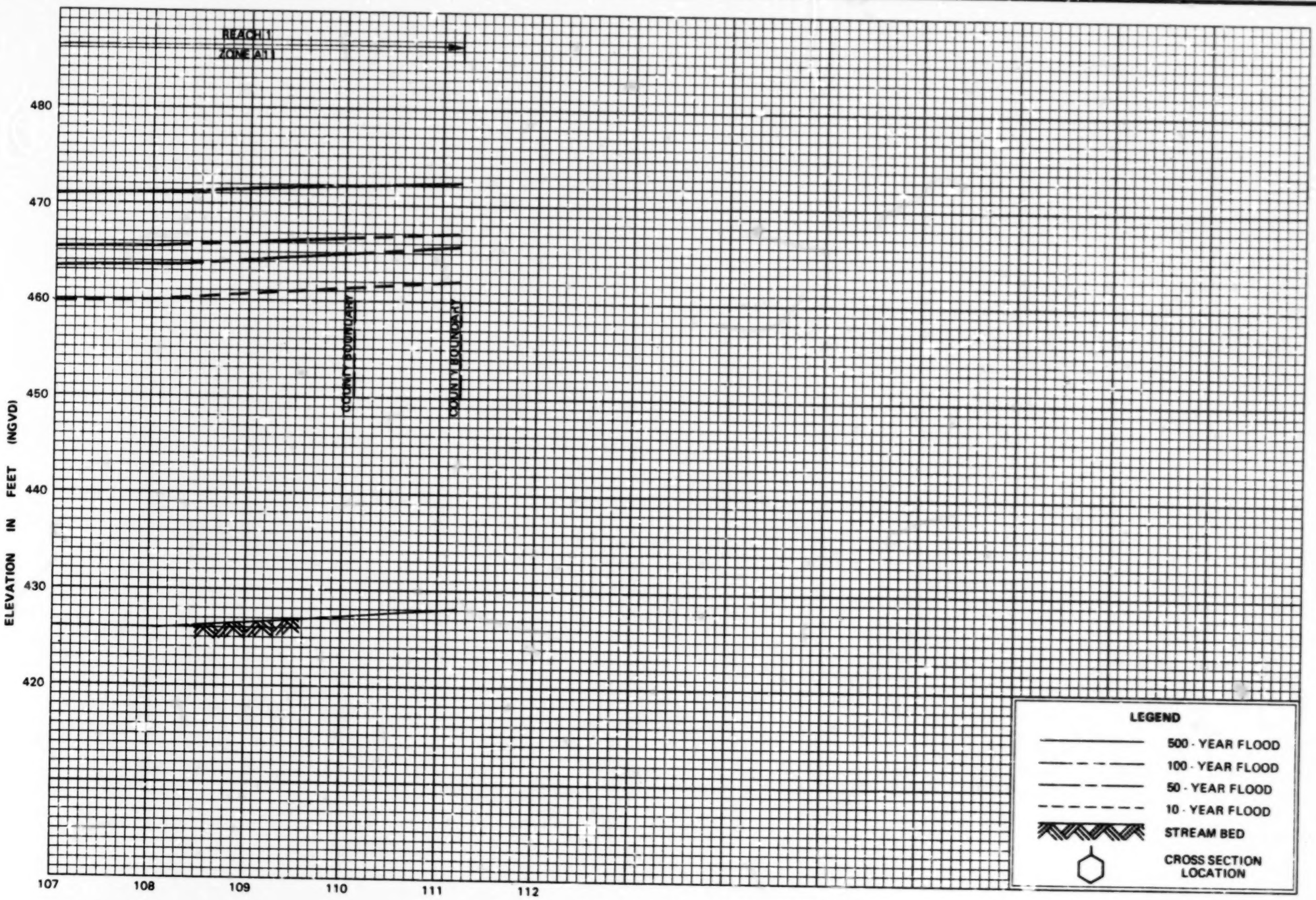
WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

66P

BEST COPY AVAILABLE



FLOOD PROFILES

WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

67P

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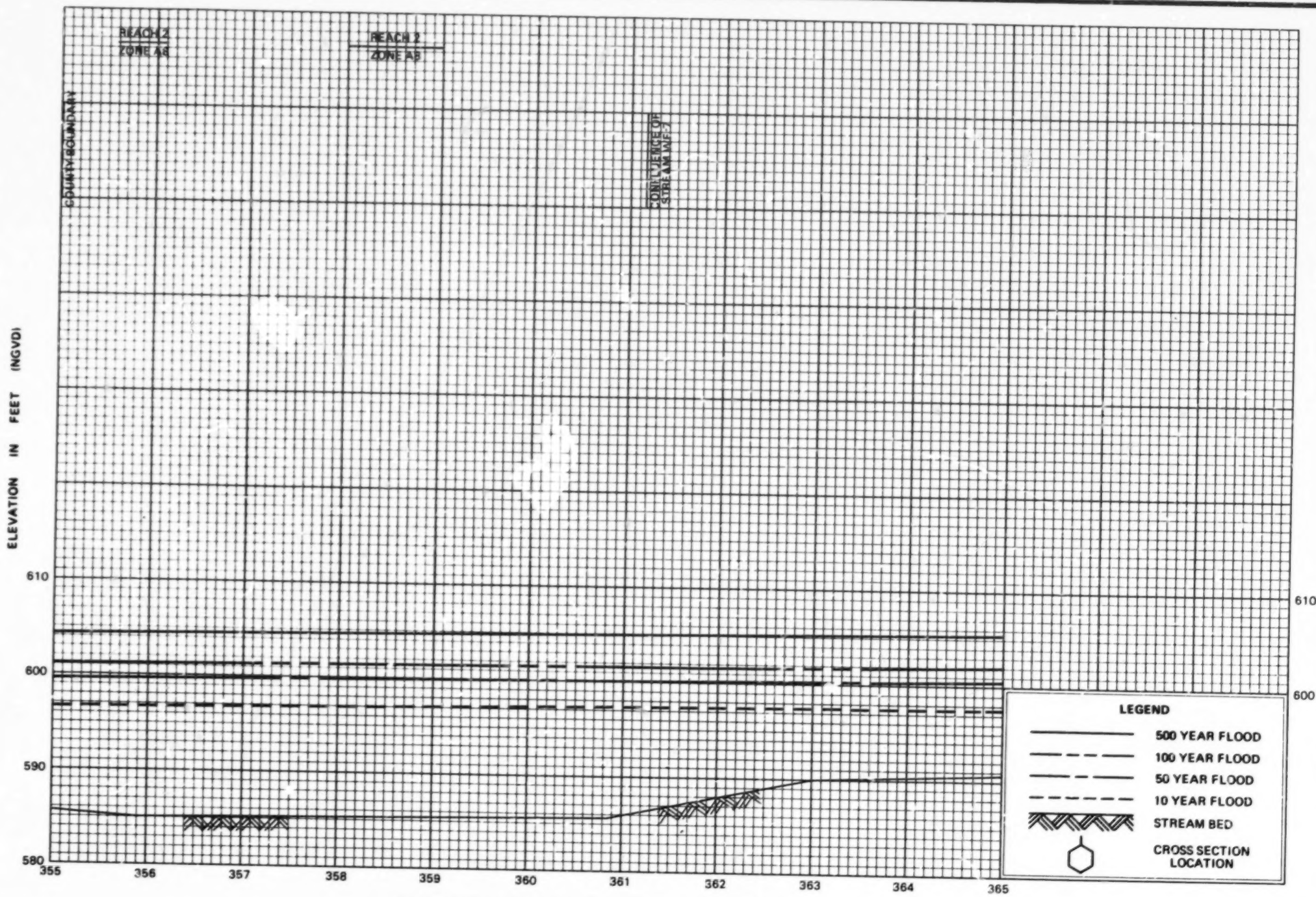

FLOOD PROFILES

WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

68P

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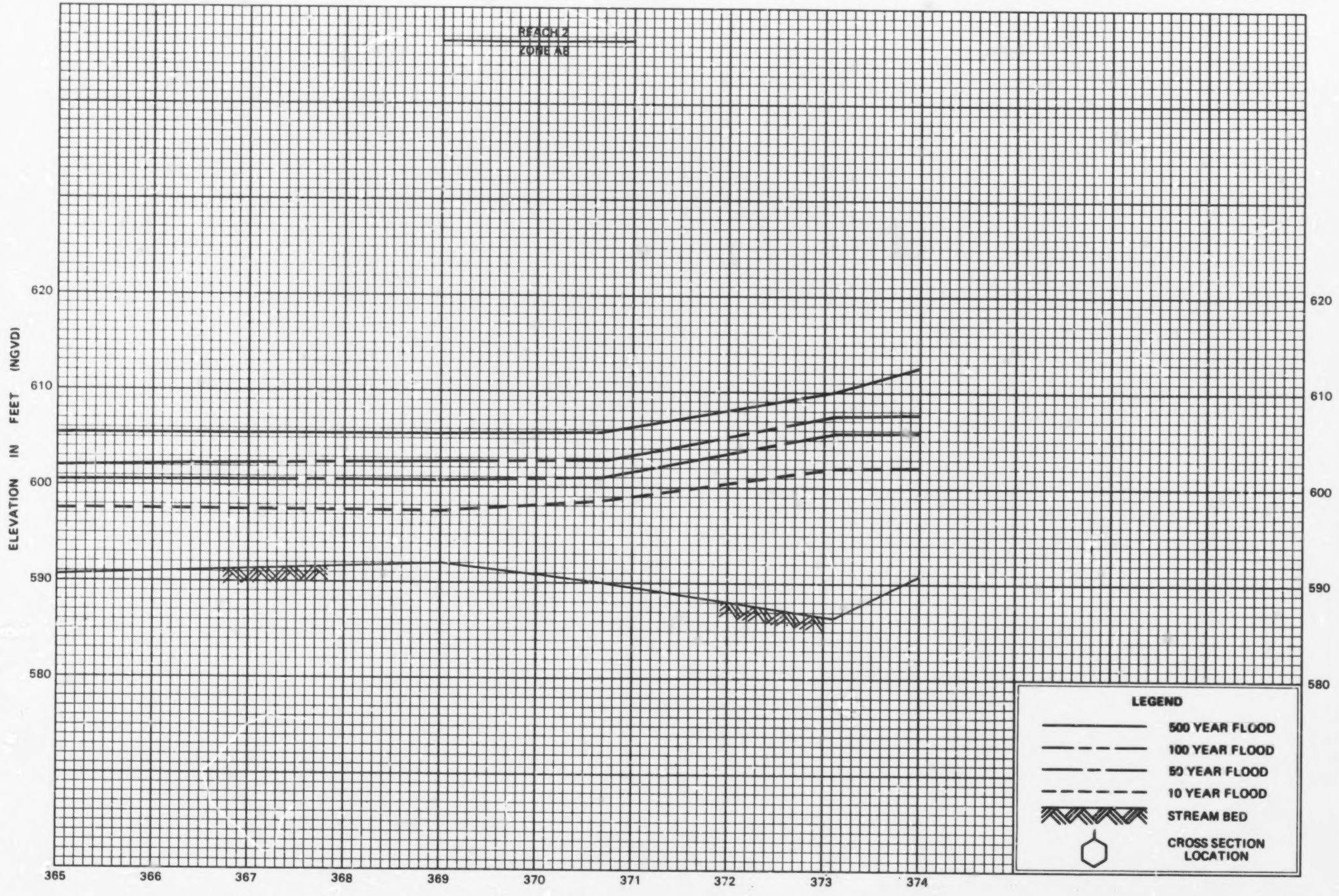

FLOOD PROFILES

WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

69P

194489

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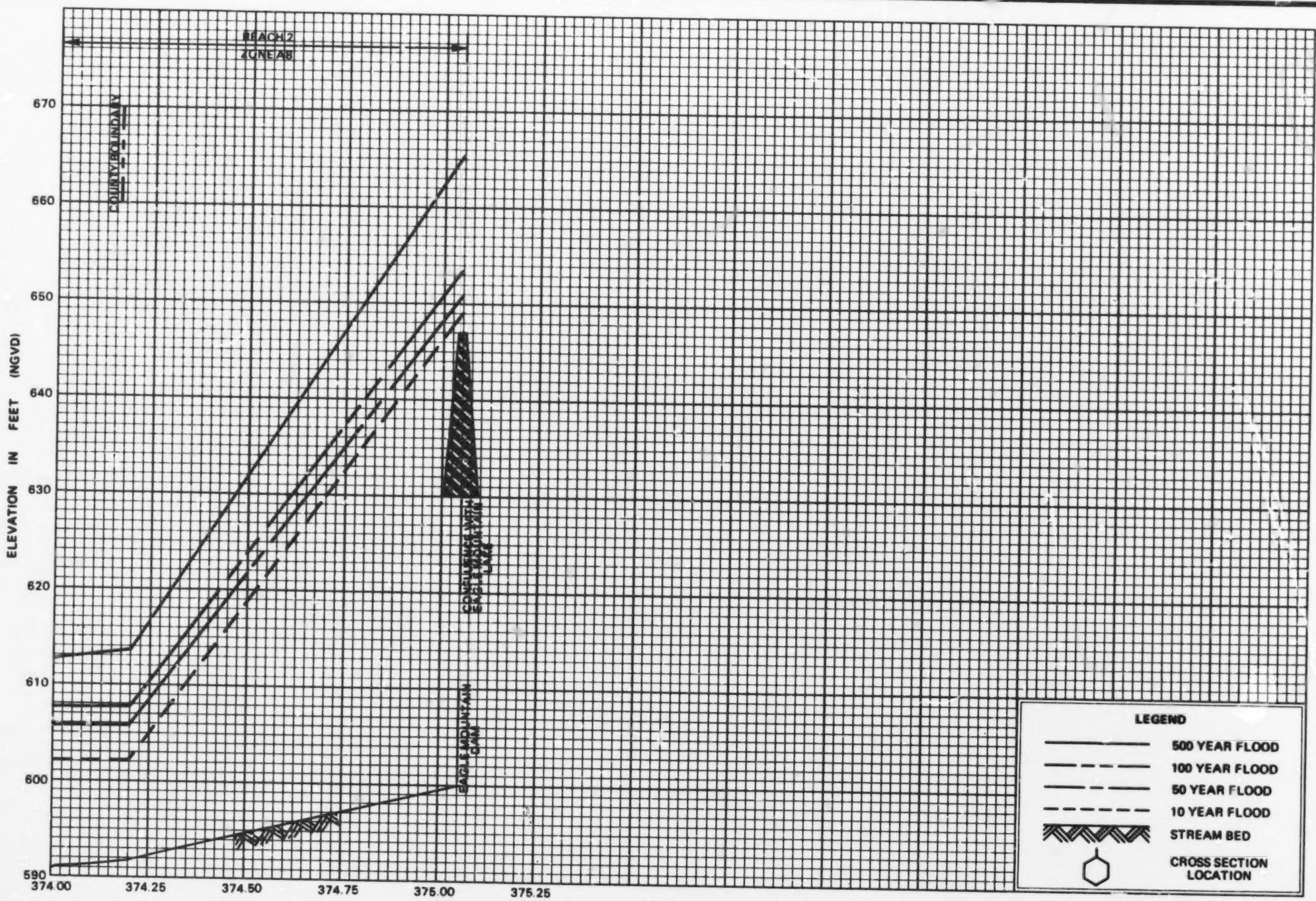

FLOOD PROFILES

WEST FORK TRINITY RIVER

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

70P

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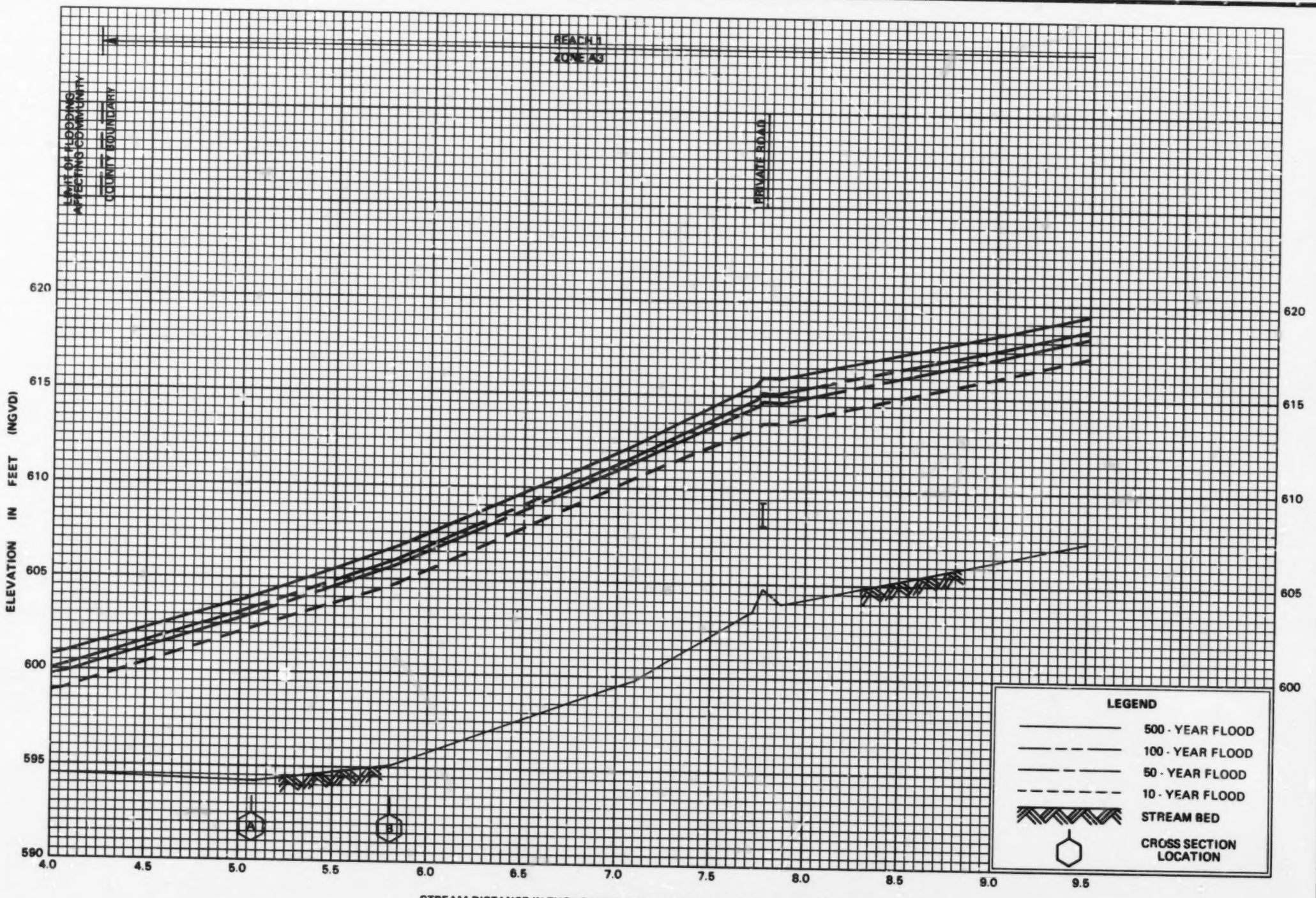

FLOOD PROFILES

WILLOW BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX

(UNINCORPORATED AREAS)

71P

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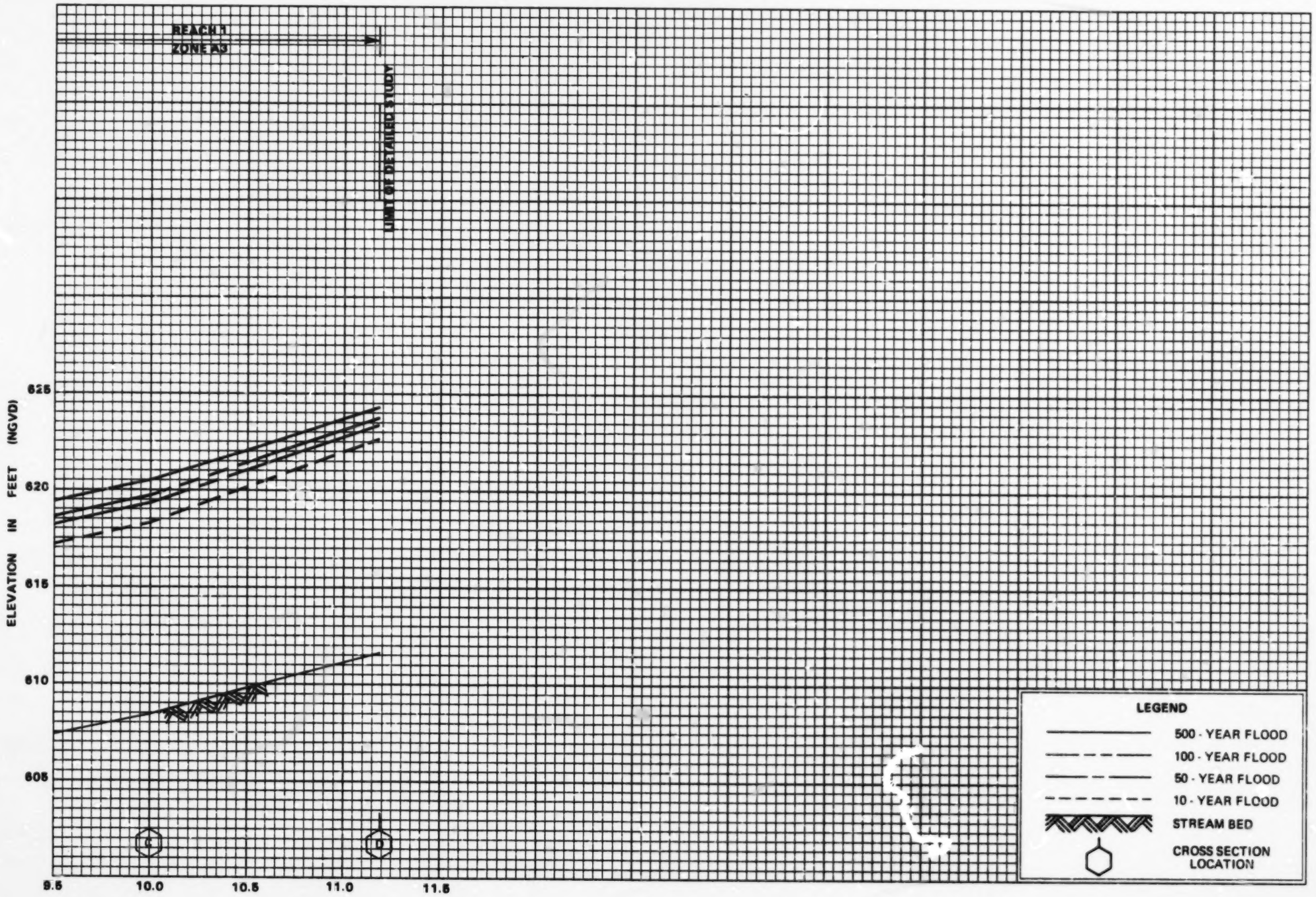


FLOOD PROFILES

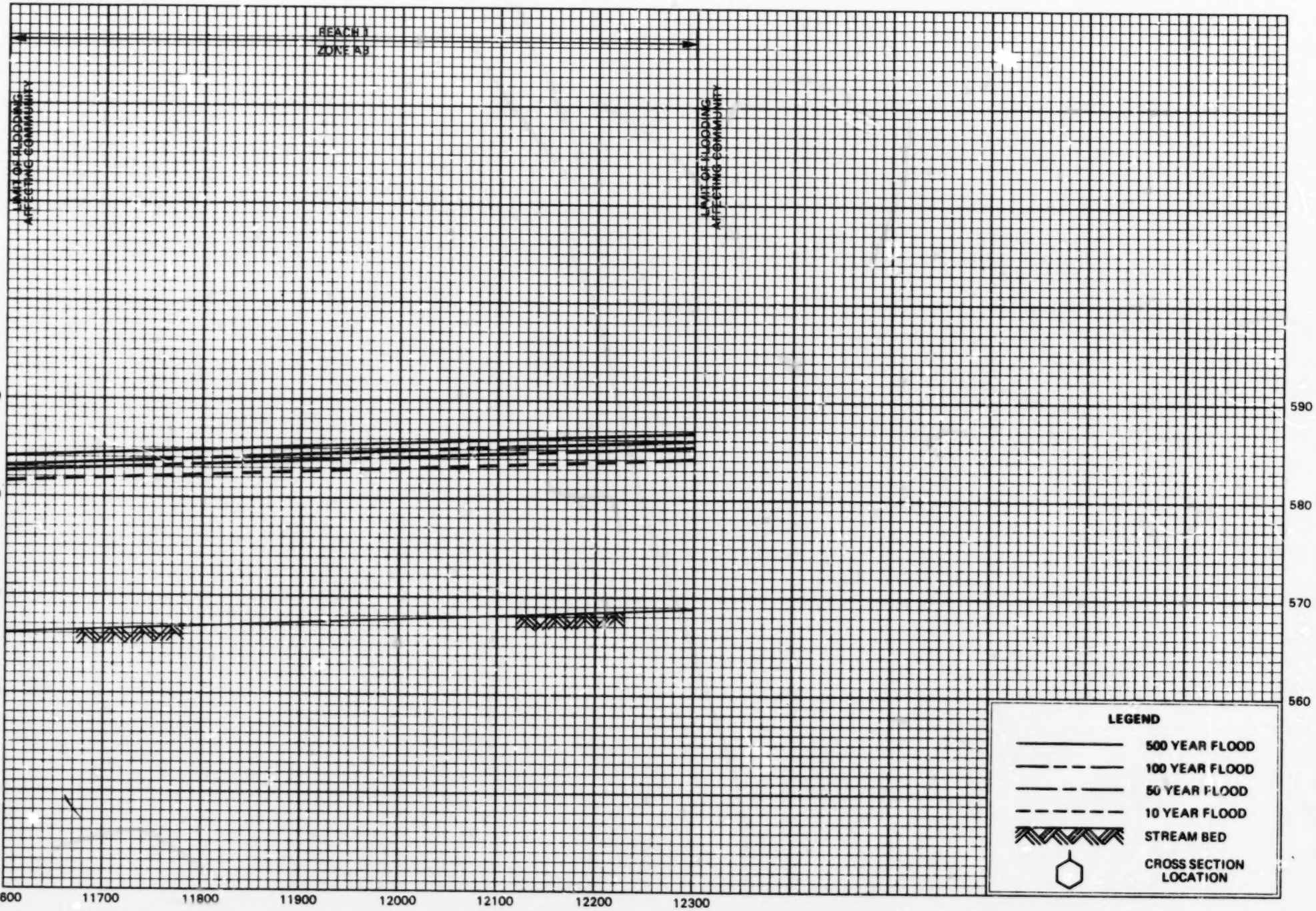
WILLOW BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

72P

BEST COPY AVAILABLE



FLOOD PROFILES

WHITES BRANCH

FEDERAL EMERGENCY MANAGEMENT AGENCY

TARRANT COUNTY, TX
(UNINCORPORATED AREAS)

73P

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